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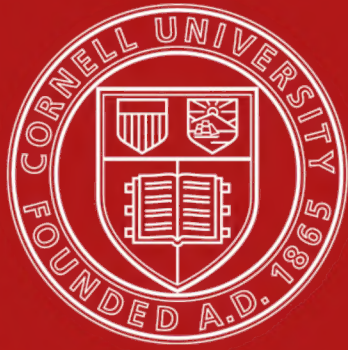
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The Doncaster regional planning scheme.



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**THE
DONCASTER
REGIONAL PLANNING
SCHEME**

1922

The DONCASTER
REGIONAL PLANNING SCHEME

THE
DONCASTER
REGIONAL PLANNING SCHEME

The Report

Prepared for the

JOINT COMMITTEE

By

Patrick Abercrombie

University of Liverpool

&

T. H. Johnson

Doncaster

Together with an Appendix on

COAL SUBSIDENCE

By

Joseph Humble

Doncaster

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FOREWORD

JOINT TOWN-PLANNING COMMITTEE FOR THE DONCASTER REGION

A CONFERENCE of Local Authorities in the area of the Coalfield surrounding Doncaster, convened by the Ministry of Health on the subject of industrial development in the South Yorkshire Coalfields, was held in the Mansion House, Doncaster, on the 16th January, 1920, at which it was resolved that it was desirable that a Regional Planning Scheme should be prepared for the whole of the area comprising the Coalfields surrounding Doncaster, and the following Authorities decided to join in the scheme :—

Doncaster Corporation.
Doncaster Rural District Council.
Blyth and Cuckney Rural District Council.
Adwick-le-Street Urban District Council.
Bentley with Arksey Urban District Council.
Mexborough Urban District Council.
Tickhill Urban District Council.

The Conisbrough Urban District was formed out of the Doncaster Rural District on the 1st April, 1921, and thereupon became a constituent Authority.

The first meeting of the Joint Town-Planning Committee was held on the 31st May, 1920, when Professor Patrick Abercrombie, M.A., A.R.I.B.A., of the Liverpool University and Mr. T. H. Johnson, architect and surveyor, Doncaster, were instructed to prepare an outline Plan and Report for the area.

The following are the representatives on the Joint Committee :—

Authority.	Representative.	Clerk.	Surveyor.
Doncaster Corporation.	F. W. Cocking. C. Theobald. E. Wilburn.	W. Bagshaw.	F. O. Kirby.
Doncaster R.D.C.	W. Appleyard. Canon T. Forster-Rolfe. T. L. Soar. M. J. Bramall.	H. M. Marshall.	W. R. Crabtree.
Blyth & Cuckney R.D.C.	W. Guest.	A. H. Styring.	A. E. Hewitt.
Adwick-le-Street U.D.C.	W. Bamford.	F. Allen.	G. Gledhill.
Bentley-w.-Arksey U.D.C.	D. M'Gregor.	do.	P. E. Woodhall.
Conisbrough U.D.C.	H. C. Harrison.	H. M. Marshall.	H. Thirlwall.
Mexborough U.D.C.	J. Wood.	J. W. Hattersley.	G. F. Carter.
Tickhill U.D.C.	H. G. Atkinson-Clark.	J. Walker.	J. Haslam.

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Alderman F. W. Cocking was appointed Chairman, and the Rev. Canon T. Forster-Rolfe, Vice-Chairman of the Joint Committee.

Hon. Secretary to the Joint Committee.—Reginald Jones, on behalf of the Clerk of the County Council of the West Riding of Yorkshire, County Hall, Wakefield.

The Report was approved by the Joint Committee at a meeting held on the 14th July, 1922.

SUMMARY OF PRINCIPAL RECOMMENDATIONS

General.

(1) The Joint Town-Planning Committee, in presenting this Report together with the Plans illustrating it, recommend the several constituent Authorities to frame town-planning schemes on the basis of the report, with such further detail as each Local Authority thinks fit, so that the recommendations may be realised gradually as development takes place, and the whole Region may grow in harmony and to mutual advantage.

(2) The Committee appreciate that the realisation of some of their recommendations may involve adjustments as between the constituent Authorities, and possibly negotiations on behalf of them all with outside bodies; and the Committee think it desirable that they should remain in being as a means of continuing and making effective the cordial co-operation which has hitherto been so manifest in their deliberations.

(3) The Committee draw attention to the fact that provisions inserted in a town-planning scheme which prescribe the space about buildings or limit the number of buildings to be erected, or prescribe the height or character (zoning) of buildings, and which the Minister of Health considers reasonable, are not matters for compensation; and therefore, in approving recommendations dealing with such provisions, they have taken care that the proposals should be such that they may be expected to be to the general advantage of all parties concerned.

(4) The Committee consider that all the recommendations, except numbers 5, 12, 13, 15, and 16, can be put into effect by means of town-planning schemes; and the method suggested for meeting the possible exceptions is dealt with in the particular recommendations.

Subsidence. (Pages 10-11.)

(5) Considerations of economy, health, and food production make it imperative that steps should be taken to prevent the land surface becoming submerged as subsidence takes place owing to the abstraction of coal from underneath. Consequently a Regional Drainage Board should be established forthwith, unifying the existing Drainage Authorities and covering the land not already under the jurisdiction of any such Authority; the Regional Board to be responsible for keeping the surface free from flooding, and in addition to existing powers to be financed by a levy of a small charge on each ton of coal raised.

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(6) Each Local Authority should not deal separately with sewage disposal, but joint schemes should be devised when the undue multiplication of outfall works can thereby be avoided.

Zoning. (Pages 23-29.)

(7) The general aim should be the development of a series of some twelve or more self-contained and well-defined towns within the orbit of Doncaster, which should develop as the capital town of the Region (see pages 85-86). Broadly speaking, the intervals should be filled by agricultural land, small holdings, allotments and playing fields (see page 5).

The Region should in general be divided into the following zones (see Maps 1-4) :—

(a) The low-lying land coloured yellow on the Maps should be allocated to industry.

(b) The low-lying land below the 25-30 feet contour should be reserved for agriculture or industry, and no new dwelling-houses should be built on it except what are absolutely essential for local agricultural purposes : particular villages are referred to in this matter on pages 71-81.

(c) The land above 25-30 feet contour can be used for either housing, commerce or clean industry (neutral zone), but not promiscuously, well-balanced communities being planned as the type of suitable local development becomes apparent.

Heights of Buildings. (Page 26.)

(8) Buildings in all but the industrial zones should be limited in height to a maximum of 70 feet, and no part of any building should project above a line drawn from the centre of the street in front at an angle of 56 degrees with the horizontal.

Preservation of Features of Beauty. (Page 28.)

(9) At Sprotbrough, the park, village and gorge of the Don should be preserved in their present condition as a Regional asset. Conisbrough Castle and surroundings should also be preserved, and as far as possible the villages of Hooton Pagnell, Campsall, Burghwallis, Hickleton, High Melton, and Marr.

Also when any road widenings take place, great care should be exercised to preserve any fine avenue or row of trees. In planting fresh avenues, care should be taken to select the type of tree best suited to local conditions.

Roads.

(10) A series of important road proposals and building lines, required for the efficient development of the area, are set out on pages 34 to 48. It is not suggested that these should be put in hand all at once, nor that when commenced the complete cross section should be constructed in the first instance ; but it is most important that the routes should at once be ear-marked, so that the way may be open whenever a favourable opportunity arises for any part of the work to be put in hand.

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Railways. (Pages 49-52.)

(11) Suitable provision should be made for railway access, to develop the land zoned for industry on the Wheatley side of the Great Central Railway, and any new bridges should, wherever possible, be designed to carry both road and rail traffic.

(12) The Midland, London & North-Western, and Lancashire & Yorkshire Railway Companies should be asked to improve their passenger services within the Region, the last named particularly in regard to the service to Askern.

(13) The attention of the Railway Companies should be drawn to the need for additional stations at Bentley, Sprotbro', Bessacarr and Harworth, and of the Great Northern Railway to the desirability of putting in hand the projected railway between Bawtry and Tickhill.

(14) The sites of new stations should be treated as a town-planning question, and roads focussed on to a 'place' in front of each of them.

(15) Bridges should be substituted for level-crossings in the cases cited on page 52, and this should be put to the Railway Companies.

Waterways.

(16) The waterways require urgent attention : three courses are outlined (p. 54), including a possible Ship Canal from Goole to Doncaster.

Civic Centres.

(17) Provision should be made in Doncaster for a Civic Centre worthy of the important Region of which the town is the natural capital. Other suggested civic or community centres are referred to in the description of particular towns and villages on page 71-81.

Filling up of low-lying land.

(18) Pit heaps should not be created or allowed to remain. All spoil should be spread to fill up areas of low-lying ground suitable for ultimate industrial use., *e.g.* (see page 67), the small area, liable to flood, adjoining Mexboro' on the Melton side, and also that near the river between Conisbrough and Doncaster.

Development of Villages in the Area.

(19) Suggestions as to the right method of development for the various villages in the area are set out on pages 71 to 81.

Park Provision for the Region.

(20) Open spaces should be provided on a systematic basis, due regard being had to their distribution throughout the Region in relation to centres of population and to where suitable land is available, page 28.

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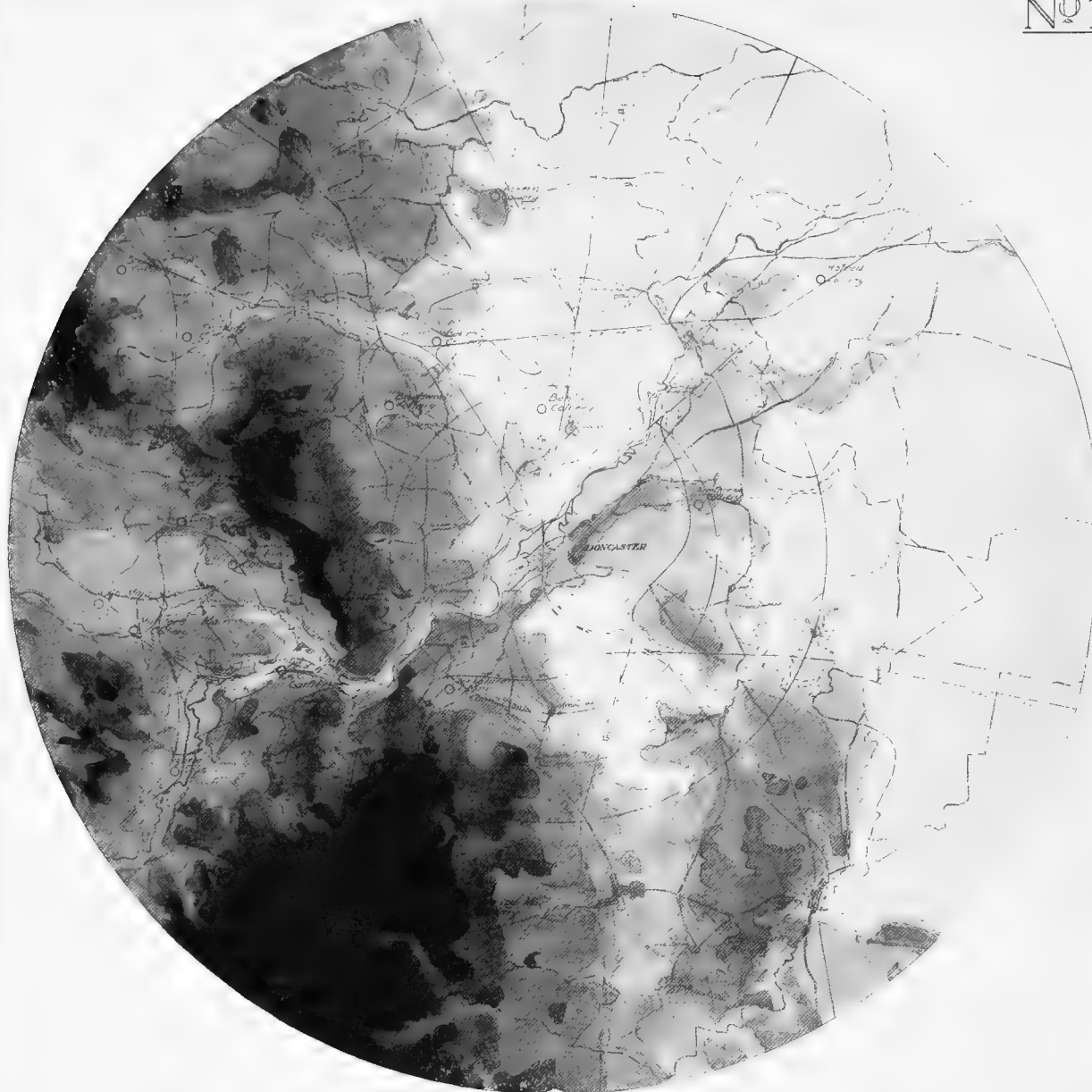
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PART I
GENERAL CONSIDERATION of the NATURE
of the REGION to be DEALT WITH

No 1.



CONTOUR PLAN.

The Town of Doncaster is here seen placed on an isthmus between two patches of low-lying land which are below the 25' 0" contour.

INTRODUCTORY

THIS is the first Regional Planning Scheme to be prepared, and the authors naturally feel some diffidence in submitting it. The South Wales Regional Survey was different: it was the work of a large Committee containing technical and non-technical members, representatives of local authorities, government officials, industrial enterprise and labour: it confined itself to an exploration of the difficulties of Regional action, a demonstration of its urgent need and general recommendations as to the objects to be secured with the best means of securing them: an actual Development Plan was not prepared.

The authors of this Doncaster Regional Scheme have plunged boldly into concrete proposals affecting in definite ways the future growth of every Local Authority in the district. It was somewhat difficult to decide what limits of detail should be observed, so as not to trespass upon the individuality of the constituent Local Authorities in their own Town-planning schemes, and so as to avoid repeating the general suggestions which it is understood will be contained in the Model clauses shortly to be issued by the Ministry of Health. It may perhaps be found that the proposals show more detail in one direction than they do in another: but, throughout, an attempt has been made to comply with the principle that the proposals should be of regional rather than local significance. Thus, Road Traffic, being of a fluid description, not static to one locality, causes quite small improvements to have wide-reaching effects: for example, a bye-pass to escape a narrow village street may open up a new long distance route. Local Open Spaces, however, which superficially might appear to be on the same scale as local road improvements, are static and quite outside the scope of regional recommendation.

With regard to preliminary survey work, the fact that it is a new area, awaiting industrial development, has rendered an elaborate analysis of its present state a less imperative need than would be the case in many other regions. The one fundamental aspect upon which a Report and Survey was necessary, as a preliminary to any development proposals, was the probable rate of Coal-getting and consequent Subsidence. The Committee were fortunately able to secure the services of Mr. Joseph Humble, whose unrivalled experience of this coalfield was placed at its disposal by means of a Report and personal explanation to the authors of this Regional Planning Report. Upon this, Mr. Humble's information, are based some of the most far-reaching and vital features of the scheme.

The other survey which would have been equally valuable to the preparation of the Scheme was a road traffic plan, based on the same principles as that prepared

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by Colonel Hellard for Greater London. But the abnormal state of road traffic, owing to coal strikes and trade depression, would have made any counts taken during the past year or so practically valueless. Fortunately the authors possessed first-hand knowledge, based upon many years of constant usage, of all the roads in the district: the Road section is the most detailed part of the Report submitted; and if each improvement lacks the supporting evidence of a graphic Road-traffic diagram, it possesses the merits of a personal experience. The road plan contains also, of course, the collective experience of the surveyors to the local authorities within the Region.

It is not suggested that all the proposed improvements should be put in hand immediately, but, in the interest of economy, it is essential that the required sites should at once be reserved and routes for roads kept open. If this is provided for—and not otherwise—the Region can develop efficiently, the necessary public works only being executed as actually required, and moreover they would cost far less than if not planned for beforehand.

The authors' thanks are due to those who have so willingly helped them in this new and complex undertaking: to the members of the Committee: to their Secretary Mr. Reginald Jones for his guidance: to the Clerks and Engineers and Surveyors of the local authorities comprised in the scheme: to Mr. Joseph Humble for opening the rich stores of his mining knowledge: to Mr. G. L. Pepler of the Ministry of Health for his continued help, advice and criticism, the value of which it is impossible to overestimate: and to many other gentlemen, land-owners, colliery-owners, industrial proprietors, Doncaster townsmen, etc., who have given them the benefit of their ripe experience.

The authors must be pardoned if they appear during the course of this Report to view the Region with enthusiasm. The picture of the future which they have endeavoured to call up is indeed one to excite this feeling, while it can in no sense be accused of a speculative or misty idealism.

Here is a district which has the chance of showing that industrial prosperity can be achieved without loss of amenity or health; and that an indulgence in the simple pleasures of a homely family life may be combined with the enjoyments of the highest flights of art, usually found only in the Great City—'La ville Tentaculaire.'

The Doncaster Region, equipped by man, without any forethought to its industrial future, with unrivalled roads and railways, possesses in its most difficult feature, the low-lying tracts, the opportunity of grouping new industries in a manner at once fortunate for themselves and fortunate for those who will work in them. Coal, the *primum mobile* of this growth and the cause of its attendant difficulties, is found at such a depth that the worst infirmity of a mining district is absent—surface cracks and frequent pit-heads.

But it is in the grouping of the population that the chief attractiveness of the picture is found. It is no longer, one hopes, possible for a single city of the numbers and density of Leeds or Sheffield to come into existence; and one contemplates with only less horror a town, equal in population, but with its people spread out at the rate of fifty to the acre.

REGIONAL

Instead, there should spring up in this Region ten or more communities—new, or so changed as to rank as new, towns complete in every respect, but of moderate size, manageable in their loose texture. Central to these, but in no sense dominating their individual existence, is to be a city, neither swollen nor tentacular, but in the truest meaning of the word, metropolitan. For major pleasures, for higher studies, for contact with great Art, dramatic, musical, and visual (which includes architecture, painting, and sculpture), the inhabitants of the surrounding communities would have, within easy reach, this focus of civilisation.

Agricultural land, small holdings, allotments, and ample space for playing-fields would form the natural matrix to these human and industrial aggregates, cementing them together and at the same time keeping them apart.

Social life in such a region should be rich and varied : there need be no tame villatic existence in the smaller communities, nor loss of touch with nature in the central city. And the industries would benefit incalculably not only from the reaction upon the mental and physical qualities of the inhabitants, but also because the requirements of industry can be met, where there is a plan, in a way that is impossible where the old haphazard methods of growth are allowed to continue. To a practical mind there appears no difficulty in carrying out this scheme of rational development ; rather does it seem to offer unrivalled opportunities to the Inhabitants, the Local Authorities, Industry and the Estate Developer by enlightened co-operation to secure great mutual benefit.

(A).—*HISTORICAL*

UP till quite recent times the country comprised within this Regional Planning Scheme was but remotely connected with any ideas of Industrial Development.¹ The exposed Coalfield of Yorkshire, Derbyshire, and Nottinghamshire, bearing on its surface such typical industrial towns as Leeds, Wakefield, Barnsley, and Sheffield, appeared to come to an abrupt conclusion on a line parallel with these towns and almost due north and south, some three or four miles west of Doncaster. Here, the Coal measures were overlaid by what has been described as ‘a discordant sheet of Magnesian Limestone or Permian’; and an agricultural countryside reposed peacefully on this intervening layer and on the Triassic Sandstones and Marls, which, also superimposed and all tilted to an easterly fall, still further concealed the coalfield and appeared to promise a permanent rural seclusion. Although the Royal Coal Commission of 1871 had suggested as an eastern limit of this concealed coalfield, a line east of the Trent, nevertheless a popular notion still existed that Doncaster was just beyond the limit where coal could be worked profitably. The late date to which this general misconception of the eastern extension of the Yorkshire Coalfield persisted was probably owing to a misreading of the Geological Ordnance Survey, which, quite rightly, showed the manifest coal measures as ceasing at the point where they dipped under the Permian sheet already alluded to. The boring made at Haxey in 1893, two miles west of the Trent (and just beyond the *eastern* boundary of our Region) proved not only that the coal measures existed underneath, but that there were valuable seams at a workable depth at a point several miles beyond the previous most easterly successful boring:² and it was also observed that whereas the general trend of the surface of the coal measures followed the eastern dip of the Permian sheet and other strata, the actual Barnsley *bed* of coal, instead of dipping too, lay absolutely flat.

In spite of these forecasts, which inevitably portended a different future, this Region continued on the surface and in the popular mind a smiling agricultural plain, containing many noble parks and mansions: its principal town, Doncaster, famed for its racecourse amid beautiful surroundings, and for one of those small local products which carry the name of a place to the ends of the earth, its Butterscotch; and its villages, with their red pantile roofs, reminiscent of the Dutchmen who drained the marshes between the Don, the Trent, and the Ouse. If one crossed the Region by the Great North Road it was hardly possible to detect the presence of the working Yorkshire Coalfield at all, though passing quite close to it at Pontefract. If approached from Sheffield, on the S.W., one remarked how the grimy

¹ The Towns of Mexboro’ and Conisbro’ as described in Part V. are an exception to the statement.

² See 1905 Royal Coal Commission, Vol. ix. p. 21.

Derbyshire Millstone-grit gave way to the clean grey Limestone as one approached Conisbrough, and this appeared an outward symbol of radical change from the industrial West Riding to the rural plains that extended to the Lincolnshire Wolds.

But these appearances are frequently deceptive:¹ beneath this farm land continued the famous Barnsley bed of coal—unaffected by its covering of later rocks; requiring, it is true, deep sinkings and so a large capital outlay, but ready to reward richly whoever was adventurous enough to open up a new coalfield and in consequence turn a sleepy agricultural community into one of the busiest industrial districts of Britain.

The first move in this direction was made by the sinking of the Bentley Pit, begun in 1905. The difficulties and expense of this operation were enhanced by the deep waterlogged sand that overlays the magnesian limestone throughout the greater part of the area surrounding Doncaster, and which hitherto had raised doubts as to the economic possibilities of pit-sinking. The district, therefore, owes a great deal to the resources and enterprise of Messrs. Barber Walker & Co. of Nottingham, in tackling this dangerous and costly operation.

No sooner had it been proved that sinking operations could be carried out and valuable coal seams reached, than the whole district became alive with colliery enterprise.

The town of Doncaster itself, however, had begun to move some time before, and quite apart from colliery undertakings. The coming of the railway in 1849 and the removal of the Great Northern Engineering Works to Doncaster was the first change towards an industrial town; and no doubt the foresight of the leading townsman of that date, the late Sir Edmund Beckett, to whom the thanks of the town are due, was the direct cause of this; and to him the first birth of its new prosperity may be attributed. Doncaster, which previously had been the centre and junction for the Mail Coaches and traffic using the broad highway of the Great North Road, changed from this time onward and grew to the great Railway Junction that it is to-day. With its seven main lines of Railways giving access North, South, East and West, by probably the finest service of trunk lines to be found anywhere in the country, the Region is connected with every part of England, and has access to the whole of the manufacturing centres of Yorkshire and Lancashire.

The centre and metropolis of this Region is indeed no upstart town like Middlesbrough. Its past importance is visibly proved by the size and splendour of its parish church (though the present structure was a re-building by Sir Gilbert Scott after the disastrous fire of 1853).

Doncaster, of course, dates from the time of the Romans, and is of great historical interest. It has played its part in the evolution of the North of England, and was chiefly famous in the old days for the sagacity and foresight of its burgesses and the strength of their own right arm. The town from time immemorial has governed itself by ancient charters² on broad democratic principles, and has not,

¹ Millstone-grit takes on a grimy hue in its weathering on the open mountain side; and the magnesian limestone retains its silver grey amid the smoke of Tinsley, Rotherham and Mexboro'.

² The charter of 1194 is the earliest known to be in existence; it makes reference to earlier charters.

DONCASTER

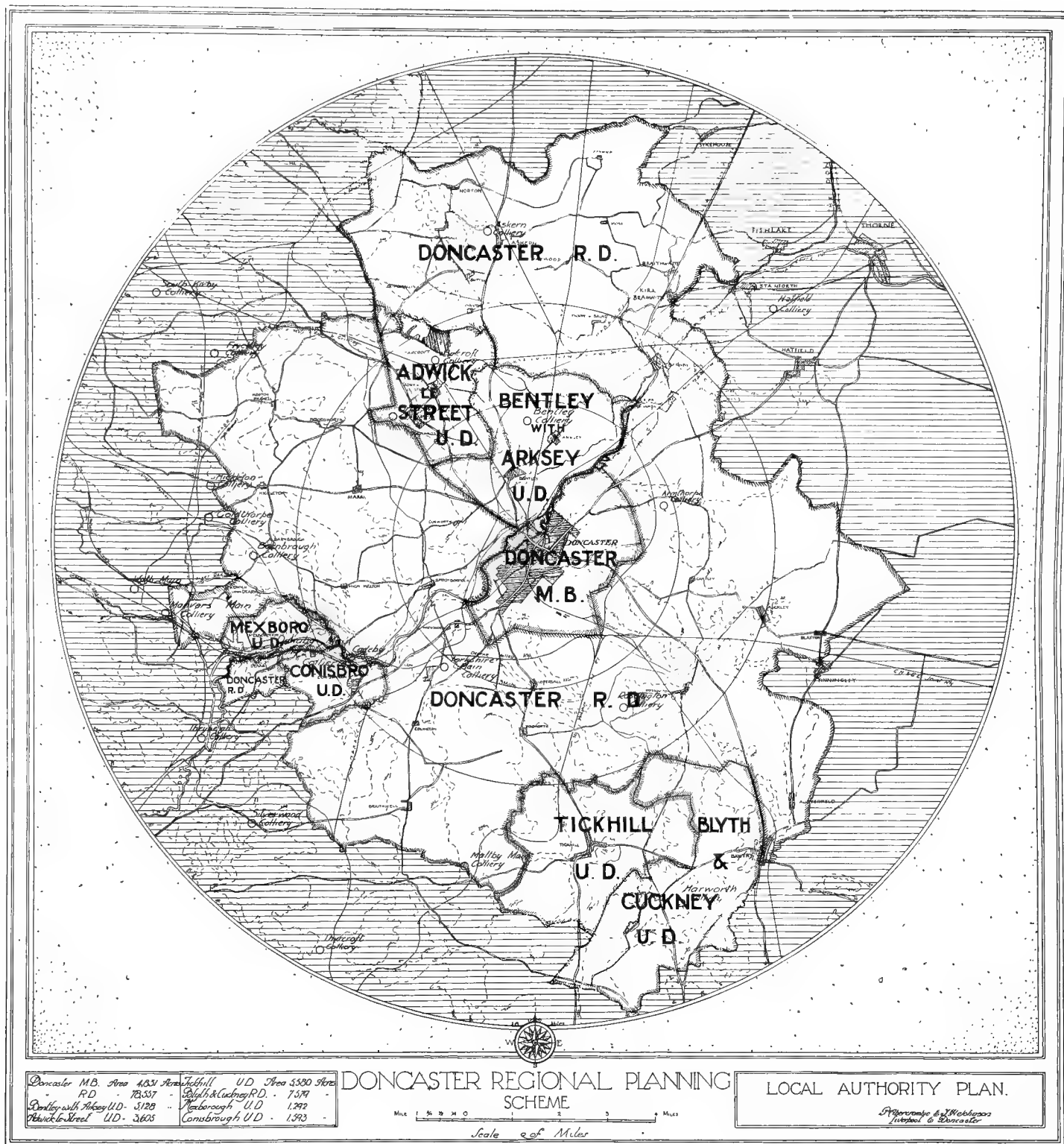
like so many of our old cities, been under the sway of an overlord. The Corporation, being the Lords of the Manor of Doncaster and surrounding manors, were wealthy landowners controlling and administering large revenues. The result of this can be seen in the streets of Doncaster, which are, for a town of its great age, amply laid out, with the survival of the Roman Cross in its midst. The one thing, however, to be regretted is the absence of old buildings; its Castle, town walls, and historic monuments were swept away by the unreasoning progressive spirit of its townsmen, before a true appreciation of these links with the past existed.

Doncaster, which was growing gradually as a market town and railway centre, naturally reacted to the Colliery workings; and since the starting of the Bentley Pit its whole character has been subtly but surely changed from a large old-fashioned and prosperous market town, which in 1865 had a population of 18,000, to the avowed metropolis of a new industrial district.

The following are the dates of the successive opening of Coal Pits in this area. Taken in conjunction with the establishment of the Railway Engineering Works in 1849 and Messrs. Pilkington's Glass Works, they give a sort of chart of progress towards industrialisation.

				<i>Date when at work.</i>
1.	Railway Engineering Works	.	.	1849
2.	Denaby Pit	.	.	1864
3.	Cadeby Pit	.	.	1889
4.	Brodsworth Pit	.	.	1907
5.	Bentley Pit ¹	.	.	1908
6.	Maltby Pit	.	.	1910
7.	Yorkshire Main Pit, Edlington	.	.	1911
8.	Bullcroft Pit	.	.	1911
9.	Askern Pit	.	.	1912
10.	Barnborough Pit	.	.	1914
11.	Rossington Pit	.	.	1915
12.	Harworth Pit	.	.	now sinking
13.	Armthorpe Pit	.	.	now sinking
14.	Messrs. Pilkington's Glass Works	.	.	1921

¹ This pit, begun in 1905, did not raise coal until a month or two after the Brodsworth pit.



(B).—*The LOCAL AUTHORITIES and THEIR AREAS
INCLUDED in the SCHEME*

THE following Local Authorities are included in this Regional Scheme, and their areas are also given :

	Area. Acres.	Population 1921.	Date of Constitution.
1. Doncaster Municipal Borough, .	4,831	54,052	1194
2. Doncaster R.D.,	78,557	26,339	By Local Gov. Act, 1894
3. Mexborough U.D.,	1,292	15,410	1858
4. Tickhill U.D.,	5,580	2,106	1864
5. Blyth & Cuckney R.D. (part only),	7,579	1,300	By Local Gov. Act, 1894
6. Bentley-w.-Arksey U.D., . .	5,128	13,043	1911
7. Adwick-le-Street U.D., . .	3,605	11,831	1915
8. Conisbrough U.D.,	1,593	15,859	1921
Total Acreage in the Regional Planning Scheme, Or about 169 square miles.	108,165	139,940	

Of these areas, it will be seen that by far the largest is that of the Doncaster Rural District Council which, except at one point, forms a complete circle round the central mass of Doncaster. Bentley and Adwick-le-Street were carved out of this Rural District in the years 1911 and 1915, and quite recently (1921) Conisbrough has been created a separate Urban District. An extension of the Borough of Doncaster took place in 1914, when 3136 acres were added to the Borough, including the Urban Districts of Balby-with-Hexthorpe and Wheatley.

(C).—*LEVEL ABOVE ORDNANCE DATUM*

It will be seen¹ that the area in its surface conformation is divided by a line running almost due N. and S. ; to the W. of this the ground rises continuously up to 300 and 400 feet, pierced about its centre by the Don, which here flows through limestone cliffs. To the East of this slope would have been found the low-lying plain which stretches to the Trent, if it had not been for a long irregular low ridge roughly parallel with its foot. This ridge is connected to the main high land by a neck upon which the town of Doncaster stands. To the North and South of the town therefore are to be found large low-lying tracts below the 25 feet contour, which, when further lowered by subsidence, it will become difficult to drain even for agricultural uses, and impossible to render healthy for residential purposes.

It will be noticed that the southern of these two low-lying areas is in the nature of a cup, as it is almost enclosed except for an isthmus or neck. From near Styrrup it is drained by the Goole Dyke or River Torne which emerges from the cup at the point where it passes under the Great North Road at Rossington Bridge. The northern low-lying area is in the form of a gradually widening wedge which merges into the plain stretching to Goole.

The larger portion of this low land is excellent for farming, if kept free from water, which there appears to be no difficulty to do except on the grounds of cost (a solution of which is suggested in the Section dealing with subsidence). This valuable agricultural land to the east and north-east of Doncaster can then be made to produce the whole or a greater portion of the vegetable and dairy produce necessary for the large industrial population which will be located in this area. The provision of means to keep the land clear of water is a national necessity ; and the opinion expressed by some Mining Engineers that it might be advisable to discontinue pumping, and thus allow the land to become sterile, cannot be acquiesced in on the narrow grounds of industrial cheeseparang.

One of the principal features of this Report consists in the recommendation that these two low-lying tracts, north and south of Doncaster, should (i) be prohibited for housing purposes, (ii) be prevented from becoming flooded, in order that they may be used for agricultural and industrial purposes.

¹ See Plate I.

(D).—*COAL WORKING AND SUBSIDENCE*

FROM the data supplied by the Regional Committee's Mining Engineer, Mr. Humble, it is possible reasonably to forecast the probable subsidence likely to take place in the Doncaster area. Already in certain places it has become necessary to raise the banks of several of the dykes and streams so that the lagoons that have formed could be pumped into them; thus, by these artificial means, keeping the surface of the land clear of water, except at times of heavy rainfall. So far as is ascertainable, the lowest point dealt with in this way at present is at Shaftholme, the Ordnance datum here being about 16' 0". There is, however, reason to believe this level is still being lowered, although very slowly. Here an electrically-driven automatic pump capable of lifting a large volume of water is placed, and appears to be a satisfactory and safe solution of the difficulty. The power driving the pump is obtained from a high tension power line which encircles Doncaster at a radius of about three miles, and it would be possible to install further similar pumping stations as the necessity arises, obtaining power from this source in a similar manner.

It is obvious from an economical and national standpoint that the large areas which must be lowered in a similar way cannot be allowed to go out of cultivation and become sterile. Already large tracts lying on the north-east side of the Doncaster Area are subject to periodic flooding from the inability of the River Don to take the flood waters fast enough; this is dealt with, in part only, by various Drainage Authorities, whose difficulties must necessarily be intensified by the subsidence caused by colliery workings.

It is felt, however, that some scheme for the unification of the various Drainage Boards should be prepared, together with power to levy a very small charge on each ton of coal raised, so that a fund could be formed to provide for the upkeep for all time of the various pumping plants necessary to prevent the land from becoming waterlogged and the formation of huge lakes where the subsidence had taken place. It is important to note that there are large areas liable to flood which are not at present under any Drainage Authority.

Equally important is it that the Sewerage Question be taken in hand on a wide Regional basis, and possibly a series of large schemes evolved, in order to obviate the multiplication of separate sewage outfalls.

Had it not been for the present unfortunate industrial conditions further mining would have been started within the Doncaster Regional Area, and it is fair to assume that within a very few years the whole district will be mapped out into various colliery interests. Landowners will look, in the future, to coal as being the important factor of value in their land, for they are prone to consider the surface value as small

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in comparison to the value of the minerals. The coal, however, is a wasting asset to the landowner.

From Mr. Humble's Report it will be seen that it is anticipated, except in the few places where faults in the coal seams may be met with, that the subsidence due to colliery workings will be gradual and even, and may result in the next hundred years in a total lowering of the datum of the district some six feet. This estimate, however, can only be assumed on a basis of the probable rate of working of the various seams of coal underlying the area ; and it may be that causes will arise either to increase or decrease this estimate. At the same time it seems certain that the best method of coal working will be to take all the coal out without leaving any pillars for support, previous experience of leaving pillars having proved that serious fracture to the surface must result from this practice. Assuming, therefore, that no pillars are left, the only fracture likely to arise is where faults exist ; and it is anticipated that within a few years it will be possible to locate the same and make any provision necessary for dealing with this part of the surface.

On the other hand it may happen that it will be found more economical in some cases to bring Steel Works near to the Coal Pits rather than take the coal to the ironstone mines ; in which case a system of mechanical stowage of the waste product from the Steel furnaces could be devised by which the underground workings of the collieries could be filled up after the coal was extracted. Many of the collieries in the Doncaster Area are plentifully supplied with water which is necessary for this process. In other cases the absence of a plentiful supply of water would make such a system of mechanical stowage too costly.

It is probable that owing to the low level of this Region there must always remain large tracts of land impossible of drainage in any way other than by artificial means, and for this reason the suggestion of preparing a sinking fund, referred to previously, appears to be the only safe solution of the difficulty.

The alternative of leaving support for the Town of Doncaster or of working the coal under the same, must be left for the final consideration of future generations. At the present it seems that either the Town should have support in some manner or the minerals should not be worked. A grave risk to Doncaster if the minerals were worked and no support left would be entailed in times of flood, when huge volumes of water pour down the river from its higher reaches. The chance of failure, from some unforeseen cause, of artificial methods to prevent flooding of the Town, cannot be taken.

(E).—*HEALTH AND POPULATION*

THE totals of population in the areas of the Local Authorities comprised in the Scheme are given in (B). It is possible to find their average densities by dividing the acreage into the numbers of inhabitants; but this average density, in which the overcrowding of built-up portions is watered down by agricultural areas, is of little significance. Similarly mean death-rates and the incidence of disease are not explanatory when taken for large areas such as the Doncaster R.D., which contain villages on the unhealthy low lands and others on the breezy uplands. A Civic or Regional Survey shown on a series of graphic diagrams should be prepared for the whole district, in order that the correspondence between the bad conditions of high density or low-lying sites and the high death-rate and the prevalence of certain diseases may be demonstrated. From this Survey it would probably appear that in certain villages in the flood lands such terrible diseases as Diphtheria may be said to be endemic.

To show how possible it is for any of the villages to change from a hamlet to a small town in a few years in this district, a list is appended of parishes in the Doncaster R.D. in which abnormal growth of the population has occurred.

Name of Parish.	Census Population.		
	1901.	1911.	1921.
Barnby Dun and Kirk Sandall .	858	882	1,379
Rossington	342	371	3,026
Askern	562	988	3,724
Norton	512	516	1,143
Edlington	158	580	5,300
Warmsworth	387	486	926
Adwick-le-Street	307	6,708	11,831
Bentley	2,403	6,487	13,043

The point to be made at the moment from the above list (which testifies to the rapid growth of the Region) is that such increase may in the future occur in villages situated on low lands which, unhealthy now, will become much more so as subsidence takes place. It is only by Regional action as recommended in this Report that such a desperate calamity can be avoided.

(F).—*INDUSTRIAL PROSPECTS : POWER SUPPLY*

THE attention of Manufacturers, Merchants and Industrial Corporations seeking the location of New Sites for the construction of Works and Factories is directed to the many advantages possessed by the Region and the Town of Doncaster for this purpose. A very slight consideration of this Report and the accompanying Plans must point the conclusion that the district comprising the Regional Committee's Area, of which Doncaster is the centre, will within the next few decades become one of the chief manufacturing centres of the North of England, connected, as it probably will be, to the sea by a deep-water Ship Canal. Geographically its position is remarkable, being the centre of a virgin coalfield, with every facility for development, and only awaiting the necessary enterprise and capital; furthermore there is the advantage that it stands on the fringe of the large manufacturing areas of the West Riding of Yorkshire and Lancashire.

Owing to the natural formation of the Regional Area, which is exceedingly flat, it is the centre of a network of the finest main lines of railways and main roads in England; the waterways give direct access to the sea, to ironstone and steelworks on the east, and to the busy manufacturing towns of Sheffield and Leeds on the west; it is indeed impossible to conceive a district better adapted for the establishment of new industrial undertakings.

The nine main and branch lines of railways converging on Doncaster connect the district with every part of the kingdom, making the town, as a railway centre for the distribution of merchandise, one of the largest railway junctions in England. The facilities for the handling of goods traffic at the Decoy comprise a transhipping station and several miles of yards, in addition to which large engine sheds adjoin where the goods and passenger engines of the several Railway Companies are cleaned and provisioned. The whole of this network of sidings covers an area of over 200 acres. Previous to the War all tranship traffic reaching the Decoy each morning from the South was dealt with during the day and delivered in Edinburgh and Glasgow the day following; traffic from the North, being similarly dealt with, reached London the next morning; and it is fair to assume that this excellent service will be resumed again as soon as normal conditions are reached in railway working.

The huge marshalling station, dealing with the traffic for the West Riding and Lancashire, being situate near the passenger station, is a busy hive throughout the whole of the day and night.

The Hexthorpe and Marshgate mineral traffic and marshalling yards, comprising many miles of lines, deal each day with a large amount of additional mineral and goods

traffic. It may safely be said that nowhere in England can traffic be so quickly despatched and dealt with.

The railway Goods Rates to and from Doncaster are most favourable to manufacturers owing to its central position and its other advantages as a competitive station.

On referring to the table of distances given below, it will be seen how centrally situated Doncaster is for the despatch and receiving of goods.

<i>Town.</i>	<i>Miles.</i>	<i>Town.</i>	<i>Miles.</i>
London	156	Edinburgh	241
Leeds	29 $\frac{1}{4}$	Glasgow	285
Bradford	36	York	31 $\frac{3}{4}$
Halifax	37	Liverpool	91 $\frac{1}{2}$
Rochdale	64	Hull	39
Manchester	59 $\frac{1}{2}$	Grimsby	47
Sheffield	18	Goole	17

Goods transport by road is easy, the main roads of the north, south, east, and west of England converging on Doncaster and leading in every direction. In so flat a district the cost of fuel, and of wear and tear, is reduced to the lowest minimum, and the saving of time reckoned in pounds, shillings, and pence is a further factor of economy which should not be lost sight of.

The Waterways of the district have not recently had the attention they deserve, but great use could be made of the fine system already existing, capable of taking barges up to 100 tons and with direct access to the sea by the Trent and Humber.

The South Yorkshire Canal connects up with the Aire and Calder Navigation, about five miles from Doncaster, and by this means Boats can reach Wakefield, Leeds, and Liverpool, forming a direct through route from the East to West of England.

For the business man the Passenger Train service will be found to be excellent. The presence of so many main Trunk Lines of Railways, passing through Doncaster and its central position, provides a direct train service to every part of England. Express trains leave Doncaster every hour of the day, reaching London in three hours, and Edinburgh in 6 $\frac{3}{4}$ hours. The East Coast Main Line (G.N., N.E., and N.B. Railway) pass through Doncaster. Leeds, Bradford, and the West Riding Towns and Hull are within one hour's journey ; Liverpool and Manchester, three hours.

For the rapid transit of parcel and fast traffic this system of Railways specially lends itself, and for commercial purposes a train service of this character is equally valuable.

As a centre for the establishment of Iron, Steel, or Engineering Works, the district presents many and varied advantages ; a number of New Collieries, now fully equipped, several of which are drawing 4000 tons of coal daily, and are assured of a life of one hundred years (in working one seam only), produce abundance of cheap fuel ; in addition, large beds of Limestone, Moulding Sand, and Clay are to be found, the district thus providing a large part of the raw materials necessary for successful and economical working. Large areas of land have been reserved for New Industries ;

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many entirely suitable sites are available at once, and could be acquired on reasonable terms. Several tracts of low-lying land suitable for tipping purposes for works' refuse would, after tipping, form suitable Works Sites for many trades. Water for Works and condenser purposes can be had in unlimited quantities, and the presence of the old channel of the River Don further assists industrial development.

Since the year 1849 Doncaster has been the centre for the design and construction of the Rolling Stock of the Great Northern Railway Company, whose Engines and Carriages are so justly famous throughout the engineering world. The Company's Works give employment for about 5000 hands, and provide an excellent class of mechanic of a very high standard of efficiency. A Royal train has been built in Doncaster. In addition to the Engineering Works of the Great Northern Railway Company at Doncaster, a large number of private Firms and Companies are engaged in the manufacture of Rolling Stock of all descriptions.

Large Engineering Works and Brass and Iron Foundries are also located here, employing several thousands of hands, so that there is no difficulty in obtaining supplies of parts of all kinds of machinery promptly and economically.

For Textile Factories it is probably the most suitable district remaining available in England. It may be mentioned here in passing that through a great lack of foresight on the part of its townsmen, Doncaster a century ago just missed its opportunity of becoming one of the centres of this great industry; Cartwright first tried to establish his works at Doncaster, but owing to opposition and other troubles was compelled to go elsewhere. It may, however, be said that this could not happen at the present day. The Corporation, realising the mistake of the last generation, is now giving its entire support and best energies to rectify this mistake, and a short time ago sold land for the purpose of erecting a large woollen mill in the town, which is working satisfactorily and was recently extended to double its capacity.

Power for New Works is available at a very low cost; an excellent system of high tension alternating current is to be had in the town from the Corporation Power Station, which has recently doubled its capacity. Outside the town a high tension power line, supplied from the several power stations of the Associated Collieries encircles the district at a three-mile radius of Doncaster, from which electric energy could be obtained for any purpose and transmitted throughout the district.

It is to be noted that a large field of intelligent female labour exists provided by the families of the colliers working in the district, and for whom little, if any, work has up to now been found.

The cost of living is low; the markets of Doncaster, which have been held here from time immemorial, are the property of the Corporation and are probably the finest in the North of England. Doncaster, being the market town of a rich agricultural district, the supplies of food are assured and good, provided this agricultural land is not allowed to become submerged.

The rates of the district compare favourably with any other part of England, and are probably the lowest in the country for any town the size of Doncaster. The Corporation are exceedingly wealthy, being the owners of an extensive corporate estate granted to the Corporation about the time of Richard I. Underlying the Corpora-

tion's estate are valuable seams of coal on which the nearest (Armthorpe) Colliery is now being sunk, and from which within a few years very considerable sums of money will be received for coal royalties. The Corporate Estate, which includes the famous Doncaster Racecourse, is well managed by the civic authorities and is the source of considerable revenue, which is judiciously applied for the benefit of the Town generally.

It will be seen therefore that the advantages which this Region has to offer are very considerable, and they may be summarised briefly as follows :—

1. A Railway System of Main Lines with a network of branches unsurpassed in any country, and connecting with every part of England.
2. A Waterway for Boats (carrying 100 tons) leading direct east to the Sea, to the west to Sheffield, and to Wakefield, Leeds, and the busy manufacturing centres of Yorkshire and Lancashire.
3. A magnificent system of Main Roads and Highways with good connections throughout the country, bringing road transport costs and charges to the lowest.
4. Valuable beds of coal underlying the whole of the area, guaranteeing manufacturers cheap supply of fuel for power and manufacturing purposes.
5. Huge beds of Limestone (Magnesian) peculiarly suitable for so many manufacturing purposes and building.
6. Beds of sand, gravel, and clay earth for use in building and brickmaking, reducing constructional costs to a minimum.
7. An abundant supply of level land suitable for building, and to be had at reasonable prices.
8. Doncaster serves as the market town of a large agricultural district, stretching to the River Trent on the east of the area, thereby assuring plenty of cheap food.

Having regard to these facts and the rapidity at which the Doncaster Regional Area is now developing (the new industrial works at Kirk Sandall being forerunners of other industries), the time has arrived for a coherent scheme for the proper development of this huge industrial district, which comprises the Don Valley, and stretches from Bawtry on the south to Barnsdale Bar on the north, and from Mexborough on the west to Hatfield on the east : roughly, an area 18 miles long and 15 miles wide.

Electricity Supply.

The importance of a supply of cheap Electric energy for Power and Lighting is an essential factor of the utmost importance in the development of a large industrial district. In readiness for the industrial expansion which must take place within a few years in the Doncaster Regional Area, steps have already been taken to ensure a cheap supply of electricity for any purpose for all time.

In addition to the Power Station of the Doncaster Corporation, which stands in the centre of this area, and the large power stations of the various colliery companies, which are already linked up, it is proposed to establish a chain of gigantic power stations along the entire length of the Don Valley, forming a portion of the proposed North-East Midlands Electricity District Supply Area, which extends from Maccles-

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field to the River Humber, and includes the Don Valley and the steel-making and iron-smelting district of Frodingham. This scheme is now being dealt with by a Parliamentary Committee, which has already taken evidence, and decided on the necessity for the construction of super-power stations in this area.

Adequate supplies of cheap fuel are available throughout the whole of this district. The coal from most of the collieries in the Don Valley is specially suitable for steam-raising purposes, and the presence of the River Don provides an efficient supply of water for condensing ; the whole thus forms an ideal condition for the establishment of power stations.

Additional power stations are proposed at Frodingham, where the waste heat and gas from the steel furnaces would supply the necessary heat for steam-raising purposes. By connecting the various proposed power stations electricity could be easily and cheaply supplied to any part of this district.

(G).—*WATER SUPPLY*

AN adequate supply of drinking water is probably the first essential to life; this is always a difficult matter, and has become within recent years acute in many of the industrial areas of England.

Since the year 1903, when the water scheme was completed for the combined towns of Sheffield, Rotherham, and Doncaster, which absorbed all the remaining gathering-grounds available, leaving practically no stream untapped, the population of the Doncaster Regional Area has increased more rapidly than any other comparable industrial district in England. The question of a supply of water has therefore been of the first importance, emphasised by the position in 1921 which showed the grave character of the problem.

Underlying the east and south-east sides of the Region huge beds of Triassic Sandstone exist in the form of saucers and act as sponges, collecting and filtering the water over an immense area, from which it is anticipated that there will be no difficulty in the future of obtaining all the supplies of water which may be required for the population likely to be located hereabouts.

The two larger diameter Water Bores which have recently been put down are about 250 and 320 feet deep, and the water is 10 to 12 degrees of hardness. Although a copious supply can be obtained at 70 to 90 feet, the water is in many places harder the nearer the surface is approached.

Continuous pumping for 48 and 56 hours at the larger bores has been unable to make any impression on the supply of water. From actual experience it appears evident that bores within about a mile of each other at about 300 feet deep may be safely put down, in districts where the Sandstone exists, without mutual effect on the supply.

It is to be noted that the reduced rest level of the water in the bores in the Sandstone coincides over a wide area in bores five and six miles apart.

Professor Kendall of Leeds gives it as his opinion that there is sufficient drinking water of a good quality and little hardness in the Sandstone to supply the needs of a much larger population than is ever likely to be found in the Doncaster Regional Area.

The supply of water should be dealt with regionally. At the present time applications are being considered from Askern and Rossington parishes for supplies from the Doncaster Corporation—both parishes being outside the authorised area of supply which includes, in addition to the Borough, the U.D.C. of Bentley and the parishes of Armthorpe, Cantley, Loversall, Barnby Dun, with Kirk Sandall, Warmsworth, and Sprotbrough.

PART II
ZONING or REGULATIONS for the
SPECIFIC USE of AREAS

INTRODUCTORY

THE restrictions upon an unfettered use of the land within this Region can only be of a general nature : more detailed subdivision will doubtless be made in the town-planning schemes which are prepared by the Local Authorities themselves. But, as a result of the general consideration which has been given to the district, certain broad ideas emerge, which are needful to form the basis of its satisfactory development.

It is clear that the low-lying land is not so healthy for residential purposes as the higher ground ; and, where the former has been lowered so as to make even land drainage a difficulty, its unsuitability for an increased population becomes manifest. At the same time the pitheads of several collieries are situated on this low ground, and more might be opened on it. Again the proximity of waterways and railways suggest that the example of Messrs Pilkington at Kirk Sandall will be followed ; and furthermore it is necessary to the prosperity of the district that collieries should flourish and further factories be established.

Labour is essential to development, but it must also be healthy and contented labour. It would never do to perpetuate the mistake of Sheffield in the past, in allowing houses to be built in the lower Don Valley, where they are unhealthy in themselves and occupy land which should be available for works.

The right solution of the problem, accordingly, would appear to be to prohibit the erection of more houses in those villages which are situated below a certain datum line and to stop the establishment of new housing schemes on the same low land : while at the same time by means of carefully considered local transport to provide facilities to render sites on the higher ground readily accessible from existing or new collieries or factories upon the lower. A road or railway system, suitable for an agricultural community centring upon Doncaster as its market town, is no longer sufficient for a growing manufacturing district containing this special problem of areas barred for housing.

Having therefore roughly allocated the areas for their most suitable use, in the next part of the Report will be shown how the necessary transport facilities can be obtained.

(A).—*MANUFACTURING AREAS*

IN the case of Factory land it is necessary to divide it into two different classes ; not however following the usual practice, according as it is smoke-producing or smokeless, or, as at Sheffield, into Heavy or Light Trades.

The existing positions of the Pitheads—dotted about the whole area, in some cases amidst the most beautiful surroundings and on high and low ground—make it extremely difficult to prohibit factories anywhere in this Region¹ except where land has been earmarked for definite housing or recreational purposes. A large area of undeveloped land will therefore be left of a neutral character, which local town-planning schemes may determine to be used for factories or not, devising their detailed plans so that houses and restricted factories are not mutually harmful. Anyhow, this Neutral Zone should carry the restriction that, except for collieries, it is to be used for smokeless factories. For the purpose of this restriction, however, it would be necessary to include in the term ‘Colliery,’ power and bye-product plants which were situated in immediate proximity with the Pithead.

In contrast to this, there is the low-lying land shown buff and green on Maps 1-4. These areas, at present largely agricultural, are only to be changed from their present use to industrial purposes. And the tendency and object of this Regional Scheme is to do all it can to *encourage* the development of these areas *first*, rather than the neutral areas mentioned above.

From every point of view of economic development it is desirable to concentrate industries on these ‘Factory only’ areas, rather than to encourage a sporadic dotting about among villages. And, generally speaking, the Transport facilities which they at present possess, and which are to be augmented under the recommendations of this Report, will decide a manufacturer in selecting a site upon them.

For the purpose, therefore, of industrial development this Region is divided into two types of area :—(i) a Neutral Zone where collieries will be allowed, but where other factories must comply with certain restrictions as to height and as to smoke and other nuisances ; (ii) Manufacturing areas proper, unrestricted for industrial use, but not allowed for houses.

¹ *E.g.*—The Factory at Finningley : this, however, by chance comes upon the low land.

(B).—*HOUSING AREAS*

THE housing development of the Region is to be encouraged and indeed restricted to what has been called the Neutral Zone, situated above the 25 feet Ordnance datum. It would be impossible, and indeed invidious, to single out areas in this higher land as more suited than others for residential purposes. The natural inference, however, would be that the land that fringes the manufacturing area proper will develop at an early date. One can foresee a succession of residential communities from Barnby Dun through Armthorpe to Doncaster on one side of the northern low-lying area, and from Askern through Carcroft, Adwick-le-Street, Bentley and Cusworth to Doncaster on the other.

The southern manufacturing area is more difficult to forecast. The village of Rossington and its adjacent area should grow rapidly, and there would seem room for two comparatively new centres of population: one south-west of Cantley and the other somewhere south of Loversall and east of Wadworth.

Besides these areas, there are the districts which are quite away from the Manufacturing Zones proper, but are near collieries: these will probably merely show an extension of the existing villages.

Finally, there is the natural expansion of the Urban Areas of Doncaster and the West Don group (see Part V.).

A very rough indication of growth upon these lines is indicated on Plate XXII.: the object of this forecast being merely to emphasise the need of focussing this growth round well-marked centres—either existing or to be created—in order to avoid straggling ribbon development along all the main roads, or formless masses of houses without vertebrate structure.

It is, nevertheless, difficult to see how by means of general Regional zoning restrictions this satisfactory grouping of new houses can be enforced on the Neutral Zone, for, with the exception of the immediate neighbourhood of the collieries, the land is all suitable for housing. Rather must it be left to the constructive skill with which the local town-planning schemes are prepared and administered. Every effort should be made when building proposals are put forward to secure that they form part of a coherent scheme, and that eventually an adequate civic centre will be produced. Fortunately some of the new villages show by their lay out that this aspect of community growth has been grasped: *e.g.* Woodlands, Kirk Sandall, and Rossington (the latter, however, coupled with serious faults).

Housing areas are therefore restricted to the so-called 'Neutral Zone,' any part of which, except in the immediate neighbourhood of the pits, is deemed suitable. There should be no need for a greater density than ten houses per gross acre on any part of this area; the acre for this purpose to be reckoned as exclusive of agricultural

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land, but including roads, local playgrounds and open spaces, churches, shops, and civic centres.¹

Such a restriction should cause no hardship to landowners, as it has been proved conclusively that the old method of crowding houses in closely packed parallel rows is not even good business : and in addition, estates laid out on sound lines, in accordance with town-planning schemes, can now be allowed certain relaxations as regards street works.

A line somewhere between the 30 feet and 25 feet contour has been taken as the limit to which houses should be permitted ; below this limit the land is reserved for agricultural and manufacturing purposes ; no new houses should be built in any of the villages situated on this low land, except such as are absolutely essential for the local cultivation of the soil. This contour line will vary under the administration of local town-planning schemes to suit the varying cases : *E.g.*

- (i) where no coal is to be got ;
- (ii) where coal is to be extracted ;
- (iii) where drainage is especially difficult—for example at a point furthest from the sea.

HEIGHT OF BUILDINGS

In order that light and air may not be unduly obstructed, and in order to discourage the erection of Tenement dwellings, it is desirable that there should be control as to the heights of Dwelling-houses and of Industrial Buildings in areas other than those set apart primarily for Industry.

A simple general standard would be the requirement that no building should in any part exceed 70 feet in height, nor project above a line drawn from the centre of the street opposite at an angle of 56° with the horizontal.

Local conditions such as subsidence may vary this.

¹ See also Part VII.

(C).—*AGRICULTURAL AREAS*

WHEN a countryside is for the greater part given up to farming, it appears somewhat unnecessary to make recommendations for Agricultural Zoning. But in a growing manufacturing district the farming becomes gradually restricted in area and less productive, owing to smoke, etc. Though it is of the utmost value for purposes of food production and general health to leave agricultural belts between manufacturing towns and large continuous residential areas, it has not so far been found easy to do this when the land to be left was suitable for factories or houses: the difference between the value of the land for either of these developments and that realisable from farming, with the consequent possible claims for compensation from owners, has so far deterred local authorities from zoning for agricultural use only. At Letchworth, it will be remembered, the land is in public ownership, in which case the community finds it profitable to forgo the development increment for its own good.

But in this district there is a case for a large agricultural area on the northern low-lying land, west of the Don, which is scheduled as unsuitable for housing. The total extent of this low-lying land is greater than will be required for factory development, and it forms a valuable wedge of farm land approaching to within one and a half miles of Doncaster.

While therefore in the Neutral Zone one may expect to see the agricultural land gradually dwindling as other development increases, there remains the purely Agricultural Zone which should at all costs be kept intact and free from flooding. (See Part I., C and D.)

It will be noticed that in the southern low-lying area, between Doncaster and Rossington, no agricultural land is left—the whole being scheduled for factories. But it may be pointed out that it seems likely that the southern portion of this Region, of which perhaps Tickhill might be called the capital, will always remain predominantly agricultural. The low-lying land to the east of Cantley and Awkley is scheduled as a definite agricultural area.

(D).—*RECREATIONAL AREAS: The PRESERVATION of FEATURES of BEAUTY and of HISTORIC INTEREST*

IT would form an exceedingly attractive task to prepare an ideal Park system for the whole of this Region, envisaging that it had reached its maximum of industrial and residential growth, basing the total extent of open space upon some such figure as one acre per 200 of the population and distributing the actual parks, etc., according to local requirements.

But in an area only the very fringe of which has been touched by industrialism, it becomes difficult and even rash to select large tracts of land at this early stage and earmark them for parks and playgrounds. Unlike many industrial districts, such as South Lancashire, South Wales, and South Teeside, there are, with one exception, no natural features such as steep hillside slopes, river gorges, upland moors or sandy wastes suitable either for farming, housing, or manufacturing. There are, indeed, the low-lying areas, but these, provided they can be kept from flooding, are first-rate agricultural land (or zoned for manufacturing), and furthermore, being divorced from housing, will not be sufficiently accessible for playgrounds, and are not attractive enough for a nature reserve.¹

The only areas in the Neutral Zone which are marked out from agricultural land are the tracts of woodland and the private parks. There are fine woods in the neighbourhoods of Brodsworth, Edlington, and Armthorpe, but none of these is perhaps remarkable enough to be preserved for its own intrinsic beauty. Private parks have already in certain cases been absorbed for the purpose of village sites rather than for open spaces, as may be seen at Woodlands: and there are others that seem equally suitable for this residential purpose.

After very careful consideration it was therefore thought undesirable at this stage to produce a Park system for the whole Region. At the same time the Ring Road, in addition to its traffic use, may be regarded as a continuous boulevard, thus forming the basis of a systematic ring of open spaces which could be acquired in contiguity to it and the rising communities which will spring up in its vicinity; Plate XX. shows some of these open spaces so articulated. It is very necessary that this systematic provision of open spaces should be borne in mind so that the large tracts already possessed by the Doncaster Corporation and the local spaces to be acquired by the new communities may be knit into a logical Regional Park System. The advantages of co-operation between Local Authorities are perhaps nowhere more obvious than in the joint preparation of a scheme for open spaces and the joint administration of them.

¹ Compare the large nature reserve of floodland on the Danube south of Vienna, which, on the contrary, is an attractive piece of wild country.



The chief Historical Remains in the District.
CONISBROUGH CASTLE



To be preserved as an Open Space on the bank of the Don.
HEXTHORPE FLATS



The Canal.



Existing Bridge over the Don.
SPROTBROUGH

The exception, mentioned above, to the absence of remarkable natural features which, by reason of their beauty on the one hand, and unsuitability to other forms of use on the other, renders them manifestly suitable for preservation, is found at Sprotbrough. Here the outcrop of magnesian limestone has been cut through by the Don, forming a gorge of extreme beauty. This, combined with the park and village, with its remarkable church, should be preserved as they are: the only change allowed should be the bridge, which will ultimately be required for carrying the Ring Road across the valley. The greatest care should be taken that this bridge does not destroy the beauty of this scene, and it is only necessary to point to Telford's Suspension Bridge across the Menai Straits in North Wales to show how artistically such an engineering feat can be accomplished. This feature of natural beauty is to be preserved of course in the interests of the Region as a whole.

The principal object of historical interest in the region is to be found close to Sprotbrough, namely, Conisbrough Castle. This magnificent limestone ruin is already thoroughly looked after, and its setting, so far as the immediately situated town and quarries will allow, is satisfactory.

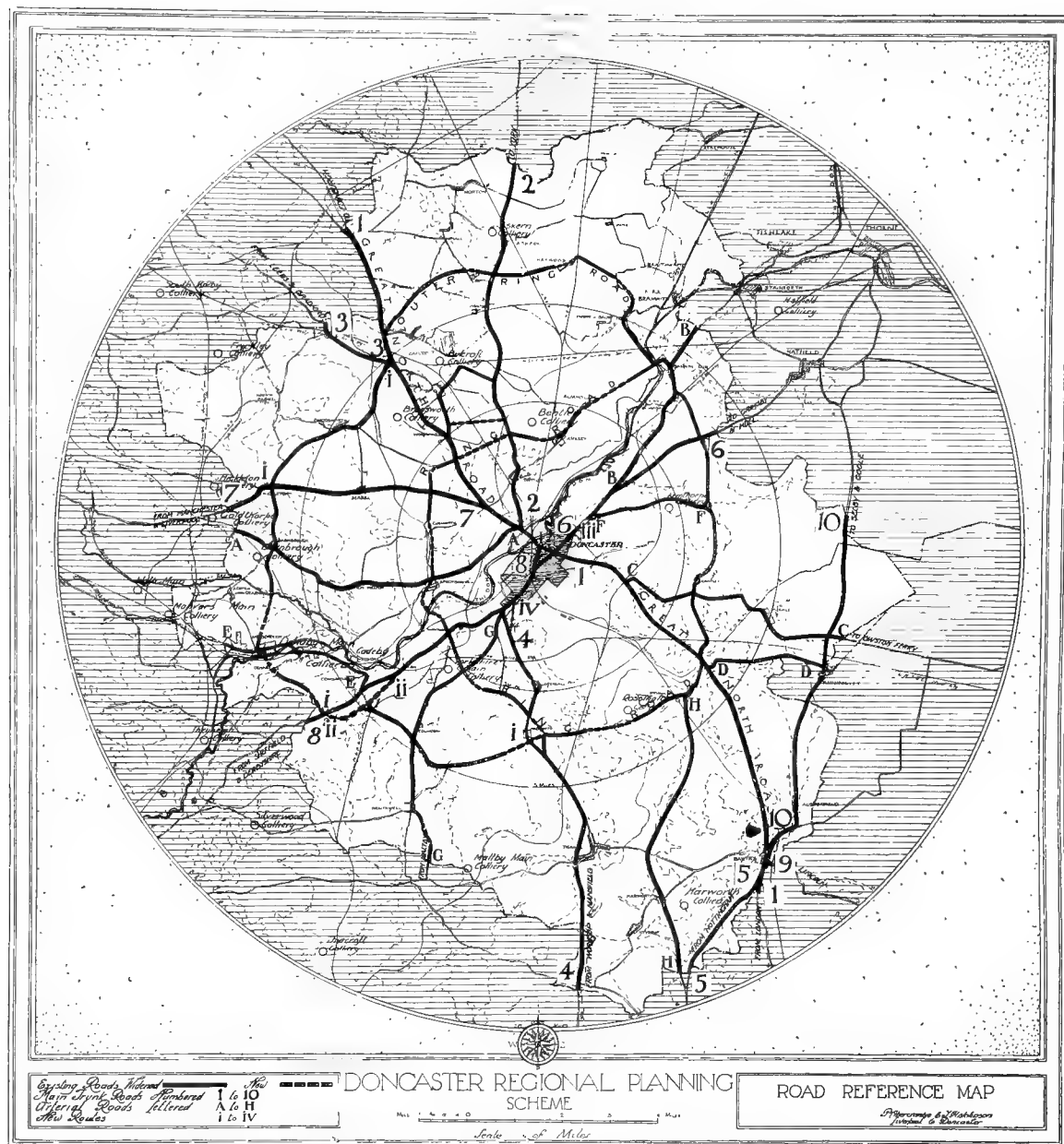
The other historic features of the district most worthy of preservation are certain of the old villages; Campsall, Burghwallis, Hickleton, High Melton, Marr, Hooton Pagnell and others still preserve their original character. Wherever possible, when these places are found on important traffic routes, the main stream of traffic should be carried beside them by means of a bye-pass: the old method of widening the village street was both costly and destructive of its charm. Hooton Pagnell is perhaps the most beautiful village in this area and, although quite close to Frickley Colliery, it will probably remain as it is.

For a growing district such as this, it is impossible to overestimate the value of the preservation of its beautiful relics of the past.

Mention should also be made of some of the fine tree-planted avenues in the Region: the Great North Road, where it enters Doncaster, Sheep Bridge Lane, near Rossington, and others: no road widening should be allowed to interfere with those trees, which could be worked into the new widths where required. It is to be regretted that the most durable type of tree has not always been planted in the past, some of those of an age of about 80 years being badly decayed. Provision should be made at once for replacing these with varieties which experience has shown will have a longer life in the district.

The tree-planting on all wide new roads should be most carefully studied.

PART III
COMMUNICATIONS
ROAD : RAIL : and WATER



INTRODUCTORY

THE existing means of communication of the Doncaster Region are remarkable in this respect—they appear to be devised, at any rate as regards road and rail, to lead traffic swiftly through the district without making more than a perfunctory stop at the Town of Doncaster itself. In a word, the Region appears to be extraordinarily well supplied with links to the outer world, but, as regards itself, full of inaccessible spots. Thus villages within four miles of the cross-roads of Doncaster find themselves provided with perhaps three or four trains a day and no road conveyance at all. This, of course, is the natural condition of an agricultural countryside.

But the fact of these main national through-routes being in existence is of enormous advantage to this district during the process of metamorphosis which is proceeding : firstly and obviously, by reason of the advantages for commercial connection with the rest of the country ; and secondly, because it is a comparatively simple matter to turn these through-routes into means of local intercourse.

It will be seen from the following sections of this part that there is no need for the costly creation of new railways¹ : and as to roads, while radially the district is fully supplied, a single road (made up largely of existing portions) with a loop on the west is sufficient to provide circumferential connection. For the rest, the widening of existing roads (still easy of accomplishment), and the bye-passing of narrow village streets and the establishment of mechanical methods of transportation, will complete without much outlay a most efficient local road system.

It is perhaps hardly necessary to say that it is not suggested that all the new Roads or improvements of old ones should be put in hand at once : but it is essential to keep the routes open so that the district can develop economically and efficiently.

¹ Beyond, of course, sidings for opening up new areas for works sites.

(A).—ROADS

THE Doncaster Region, as already mentioned, possesses an unusual system of radiating roads: but though their widths are in most parts adequate for through traffic passing in the midst of open country and along remote or rural village streets, a careful study of every yard of them is necessary to ensure that they will take the same amount of through traffic, augmented by the local traffic of a manufacturing district, and the marginal obstructions of a built-up area. Owing to the almost universal use of the main roads by all classes, it is felt that some better system should be devised to provide for their maintenance and upkeep. A large amount of heavy through traffic makes use of the main roads in this area, and an adequate method of construction, strengthening and maintenance has become too costly to be borne locally. The time has come for the Imperial Authority to assume responsibility for all main roads. When one considers how heavy are the axle loads carried by the roads in this area, it must be confessed that in nearly every instance they bear favourable comparison with the roads of any part of England.

The ideal road surface suitable for all kinds of traffic does not appear to have yet been found, a surface suitable for horse traction being entirely unsuitable to stand the wear and tear of mechanically propelled vehicles. Again, many of the roads will not stand the fast-moving heavy lorry traffic, which appears to tear up the road surfaces entirely through the speed at which these vehicles travel, for heavier vehicles with smooth tyres, travelling slower, do not show as much damage.

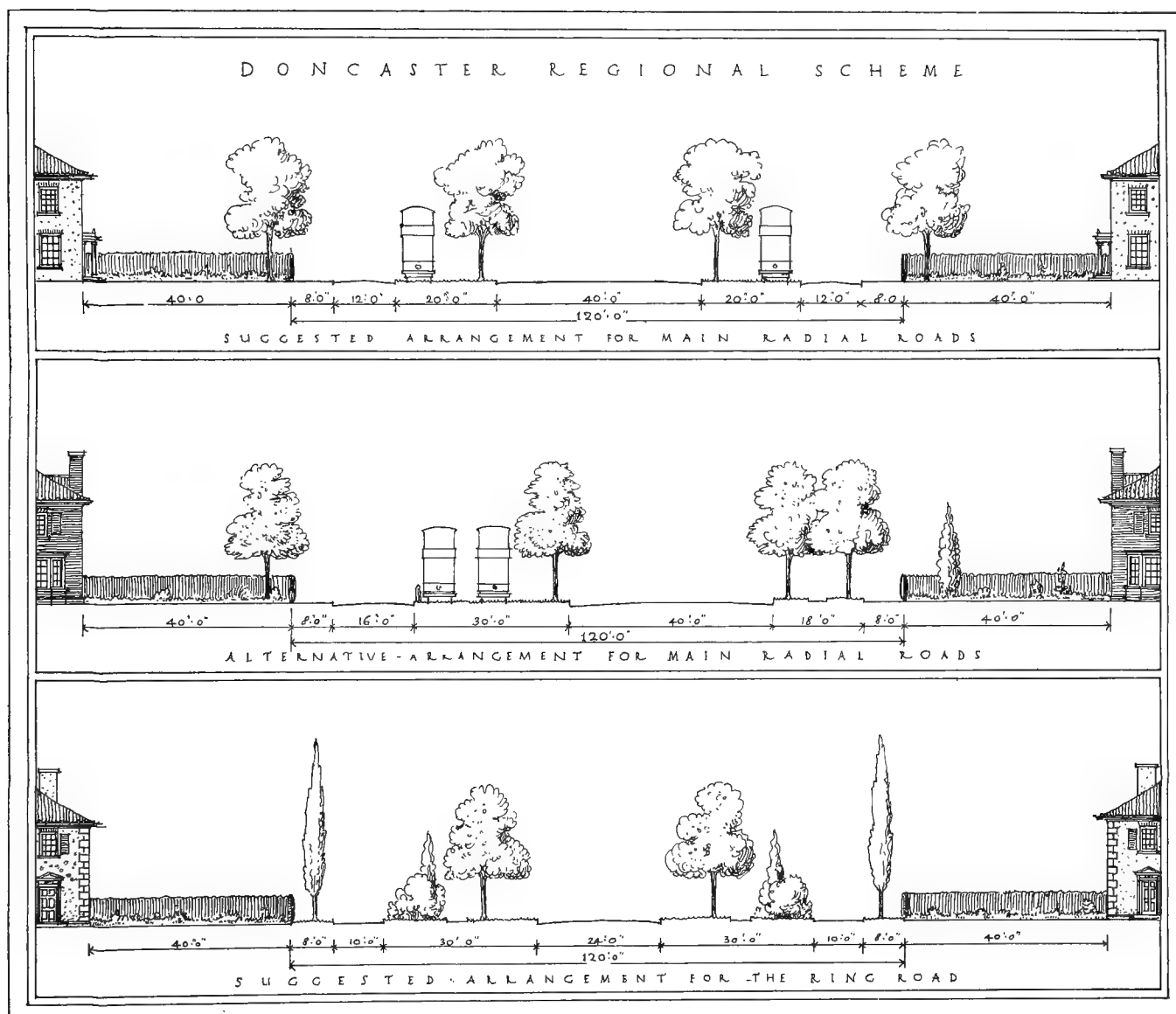
The width of 120 feet, with building lines set back a further 40 feet from the fences on either side of the road, which is put forward as a standard for the National Trunk Roads and the Ring Road, has been arrived at as a result of a study of roads for similar purposes elsewhere and of the latest traffic width-units adopted by the Ministry of Transport.

At Liverpool the original width of 80 feet for the great circumferential Boulevard, Queen's Drive, has now been increased to 120 feet as a normal size, and the same standard is used in Birmingham and other towns: this has also been adopted for the new Tees-side Road now in course of construction between Thornaby and Middlesbrough, Redcar and Saltburn.

The same arrangement of carriageway, tram track, paths, grass strips, etc., would not be used in every case. But, generally speaking, a carriageway of 40 feet (four traffic units) should be regarded as a minimum. Alternative arrangements are given, see Plate VI.

The whole cross-section would rarely be completed at once, but it is important to reserve the land so that when increasing traffic necessitates greater width of paving the land required is at the disposal of the Local Authority.

In many parts of the Regional Area there is a considerable want of warning signs on the roads: this can no doubt be accounted for by the abnormal developments that have taken place within the last few years, where villages with popula-



Suggested arrangements of Roads.

tions equal to small towns have sprung up on sites which in many cases ten years ago were nothing but agricultural land.

It has been found convenient to divide up the roads under consideration into four groups, their descriptions as existing and the recommended improvements being taken together in each case.

(i) Firstly, there are the ten national trunk roads, which, with one exception, converge on Doncaster. These are not all of equal importance nationally, the Great North Road outweighing the others in fame and grandeur.

(ii) Secondly, there are those roads which apparently carry a traffic almost as heavy as the trunk roads, but which have their origin and are self-contained within the Region: these have been called Regional Arteries.

(iii) Thirdly, it was thought useful to group together the new routes recommended and the bye-passes, when these are large and long enough to become practically alternative new roads.

(iv) Finally, there is the Ring Road—the only really big innovation which is required. And even this new feature is largely made up of existing sections linked up and amplified.

The numerous improvements which are suggested in the villages situated on these roads are grouped on to two detail sheets. Immediate steps should be taken to prevent any building which would render these improvements impossible of realisation.

I.—NATIONAL TRUNK ROADS

No. 1

THE GREAT NORTH ROAD OF ENGLAND (LONDON to EDINBURGH)

This road, numbered 'A1' in the Ministry of Transport's scheme for the numbering of the main roads of Great Britain, is constructed on the site of an old Roman highway, is of the greatest national use, and is probably the most important road in England. It may be said to divide the Doncaster Regional Area in the centre; entering the area in the county of Nottingham just south of Bawtry, it passes out of the area at Barnsdale Bar in the county of York about eight miles north of Doncaster. It has a fine surface throughout with practically no gradients, and being of great width is especially adapted for transport purposes of all kinds. There are, however, two obstructions which should be removed: the old Double Bridges Bar and the old Toll Bar House, about two miles south of Doncaster. Shortly before reaching the Town of Doncaster the road runs alongside the Racecourse, where it widens out and is flanked by avenues of trees forming a most impressive entrance into the town. After reaching the top of Hall Gate, where the junction roads to Thorne, Goole, etc., leave on the east and the Sheffield Road on the west, the road is considerably narrowed and is again further narrowed at the High Street, which also forms the principal street of the Town of Doncaster.

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At the present time the High Street is considerably overloaded, particularly with heavy traffic, and urgently requires relief. During many hours of the day it is taxed to its utmost capacity. A return of a census of traffic recently made showed that some 2000 vehicles used this road for through traffic during twelve hours of the day.

After passing the centre of the town the road is again narrowed by the River Don Bridge (the widening of which is now being considered). A little distance farther on it is carried by flood arches built of stone, and, although of reasonable width, these must require replacement within a few years as the present heavy traffic is more than the arches were designed to carry. After this point the road again assumes the same high-class character, being practically straight and free from corners and turns. The grass verge on one side of the road carries the tram track to Brodsworth. It is suggested that the grass verge on the other side of the road should be taken into the carriageway to widen the same between Doncaster and Brodsworth, and that the bends in the road at Robin Hood's Well be removed. An adequate building line (say 40 feet) should be prescribed along the entire length in open country of the Great North Road, as, owing to its national character, every precaution should be taken to provide for any future invention which may revolutionise the means of transport, and make the widening of this route a national necessity. For this purpose the width of the road between fences is suggested to be 120 feet, with building lines set back 40 feet from the fences.

No. 2

THE YORK AND SELBY ROAD

(LONDON to YORK)

Leaving the Great North Road just beyond the Don Bridge at Doncaster, this road as far as Old Bentley village is totally unfit for the traffic it carries. It is too narrow and congested with traffic and tramways, and is difficult to maintain owing to the heavy axle loads. For some distance the road passes over flood arches which are continually giving way. The tram lines in many places are single track, although the traffic carried by them is sufficient to warrant a double track throughout. It is impossible to widen this road at anything like a moderate cost owing to its being narrow and built up to on both sides. The only solution here appears to be the opening out for through traffic of Watch House Lane, which runs from Bentley and (about one mile from Doncaster) joins the Great North Road. By suitably widening and strengthening it a good road could be made, including in the project a portion of the old part of Bentley Street. The local traffic would then be carried partly by Bentley Road and partly by Watch House Lane.

Beyond Bentley the road is good and considerably wider ; but provision should be made for it being widened as required. At Owston a narrow bridge, over a stream at the foot of the bridge approach over the West Riding and Grimsby Railway, requires immediate widening and straightening.

Several road intersections urgently require corners opening out, to allow traffic entering this road to do so with safety.



Cooke Street, suggested to lead by Watch House Lane to Great North Road



Showing Tram Line through narrow Main Road to York and Selby.

BENTLEY

REGIONAL

Farther on the road is altogether too narrow where it passes through Askern ; and as the buildings abutting on it here are for the most part exceedingly old and of little value, a favourable opportunity presents itself to prescribe a new building line, including the widening of the junction of Moss Road with the Selby Road which forms the centre of Askern.

North of Askern the road passes through agricultural land, and provision should be made, together with a prescribed building line, for widening the entire length of it. At about one mile north of Askern the road passes out of the Regional Area. The total length in the area is about nine miles, the whole of which is practically flat, with no gradients whatever.

No. 3

THE WAKEFIELD, LEEDS AND BRADFORD ROAD

(LONDON to CARLISLE, via BRADFORD)

Leaving the Great North Road at the 'Red House' (five miles north of Doncaster), this section of road carries probably the heaviest loads into the West Riding manufacturing area. At the 'Red House' a slight easing of the road is required, as present traffic coming from Wakefield is concealed at the junction. The length of road from the 'Red House' to where it passes out of the Regional Area is two miles, and practically the whole of this requires widening to a width of 120 feet between fences, with a building line set back 40 feet. At the junction with the road to South Elmsall and Hooton Pagnell the corners should be considerably widened out, this work being urgent.

No. 4

THE WORKSOP, OLD NOTTINGHAM ROAD

(The NORTH to the MIDLANDS)

Originally an old Roman road, it requires widening throughout the Doncaster Regional Area. A large amount of heavy through traffic is carried by it, and must always be so, owing to its being the nearest way to Mansfield and the North Derbyshire industrial area. Where it leaves the Sheffield Road it immediately passes into the narrow street of Balby Low Road ; a suggested bye-pass for this is referred to on page 46.

From Balby forward to Loversall several corners occur, all of which could be removed in the suggested widening. At Loversall a narrow village street with a dangerous turn could be avoided entirely by the construction of a short length of new road. The hill at Wadworth requires regrading and two bad corners taken out ; this would necessitate the demolition of some very old property. Beyond the village of Wadworth to the entrance to Tickhill village the road is straight.

It is suggested that the present back road at Tickhill should be opened out, widened and straightened, so as to form a bye-pass for through traffic ; the village

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street of Tickhill, which contains several ugly right-angle corners and danger spots, would by this means be relieved of the heavy through traffic.

At the south end of Tickhill back road, a small piece of new road would be necessary to complete the bye-pass.

This road after leaving Tickhill is somewhat wider, but should an opportunity occur it should be made the width (80 ft.) shown for main roads with the requisite building lines.

No. 5

THE NEW NOTTINGHAM ROAD (via BLYTH AND OLLERTON)

(The NORTH to the MIDLANDS)

Leaving the Great North Road just south of Bawtry, this road forms the best means of access to the new colliery village of Harworth and will eventually become one of the important roads of the country, as, without passing through any villages except Blyth and Ollerton, it gives direct access to and is also the shortest route to Nottingham and the Midlands from the North of England. It follows the site of an ancient road, has a good width between hedges for the most part, and only requires widening in a few places, together with the straightening out of a small number of sharp turns. The importance of carrying this work on as soon as possible should not be lost sight of, as it is already being largely used for through traffic, which increases each year, and forms somewhat of a relief road for Road No. 4.

This road is only in the Regional Area a little over three miles, passing out before reaching Blyth.¹

No. 6

THE THORNE ROAD

(DIRECT ROAD to GOOLE, GRIMSBY and EAST COAST)

This road, running direct to the East Coast from Doncaster, forms the main East to West route in the centre of England, linking up the roads from Liverpool, Manchester, etc., to the ports of Goole and Grimsby and the East Coast. The road is practically flat and fairly wide, with a good width between hedges, but should be increased to main road width of 120 feet, with 40 feet building lines.

This road will also carry all the traffic coming from the new villages of Armthorpe, Kirk Sandall and Stainforth into Doncaster, and will eventually become a route for trams or motor buses. It already carries a very heavy load—practically the whole of the road traffic going to the port of Goole and into Lincolnshire, Grimsby and Cleethorpes, *via* Keadby Bridge, which includes a large amount of holiday traffic of the char-a-banc type, coming from the West Riding towns to Cleethorpes. Moreover, it is anticipated that a bridge will be put over the River Ouse at Boothferry, near Goole, thereby reducing the distance to Hull by this road about ten miles. Altogether, having regard to the traffic which this road may reasonably be expected to be called upon to carry, it is of great importance that the provision suggested be made.

¹ Since this was written the improvement has been carried out.

REGIONAL

At Hatfield, seven miles from Doncaster, the road passes forward through Thorne, where the Canal Bridge requires strengthening. From Thorne to Goole it is somewhat narrow; several small bridges require regrading and the wooden bridge over the Dutch river replacing, as it is totally unfitted for the heavy through traffic using it, forming as it does the principal means of access to Goole. The road approach to the bridge requires considerable alteration; at the present time this approach from either side is entirely concealed to opposing traffic.

No. 7

THE BARNSELY (MANCHESTER) ROAD

(DIRECT ROAD WEST to MANCHESTER and LIVERPOOL)

This road leaves the Great North Road about two miles north of Doncaster; it is in a bad state owing to the fact of its being the main road to Manchester and Liverpool and too narrow to carry the large amount of very heavy traffic using it, including a motor bus service from Barnsley to Doncaster.

The road at two miles from Doncaster passes through Scawsby, where it is narrow, and about two miles farther on runs through the village of Marr; at both these points widening is required urgently.

It should be widened throughout to 120 feet, with building lines of 40 feet, and the dangerous corner at Hickleton should be removed as soon as possible. The road passes out of the area about seven miles from Doncaster. This road also acts as the chief means of access to the large colliery village of Goldthorpe and the thickly populated area of Bolton-on-Deane and the adjoining villages.

No. 8

*THE SHEFFIELD ROAD*¹

(GIVING ACCESS to DERBYSHIRE)

Provision should be made for widening this road throughout; also for a bye-pass at Conisbro' (referred to on page 45), where a dangerous hill and cross-roads exist which the bye-pass road would largely eliminate. The traffic carried by this road is of an extremely heavy axle load which must in the near future further greatly increase. It is almost certain that within a few years car lines will be constructed on it to link up the Rotherham and Sheffield trams with Doncaster. The road should be widened to a width of 120 feet, with building lines of 40 feet.

Considerable widening is urgently required to Balby High Road (in the borough of Doncaster); also where the road runs through the village of Warmsworth a very dangerous bend of the road exists, which should receive immediate attention.²

The length of the road from the town of Doncaster to the boundary of the Regional Area is six and a half miles.

¹ For alternative route from Sheffield to Doncaster, avoiding Rotherham, see Addendum on page 41.

² See Plate X. No. 17.

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No. 9

THE LINCOLN ROAD

(THE NORTH AND DONCASTER to THE EASTERN COUNTIES)

The entrance to this road is an exceedingly dangerous one, leaving the Great North Road (No. 1) at Bawtry by a right-angle turn from a wide road into a very narrow street, with two other similar right-angle turns following within a few yards. It has been the scene of many serious accidents.

A short length of new road about 80 yards long and 100 feet wide, which, if provided (now the site of an old garden), will remove this danger, should be constructed at once as the cost would be only slight. This is the main road to the Trent Bridge at Gainsboro', giving access to the Eastern Counties and the towns of Lincoln and Louth and to the sea. There are dangerous corners at Grinley-on-the-Hill and Beckingham, both outside the Regional Area.

No. 10

THE BAWTRY AND SELBY MAIN ROAD

(LONDON to YORK (avoiding DONCASTER) and eventually to HULL)

At Bawtry, nine miles south of Doncaster, an important main road leaves the Great North Road (No. 1) and, running through Austerfield and Finningley, passes out of the Doncaster Area three miles beyond Blaxton. This road, called the Bawtry and Selby Main Road, was constructed about 1760, at which time, and until the advent of the railways, it formed an important route in the district. In the old days, when Thorne was a busy riverside port and the Don a much used waterway, this road carried an enormous amount of road traffic, taking goods to and from Thorne. With the coming of the railways the river traffic gradually ceased, and the road for some years has formed little more than the means of communication between adjoining villages.

Now that road transport has again come to the front the importance of this road will be readily seen. It is of considerable width and only requires corners easing in a few places and widening where it passes through the small village of Austerfield, with a short bye-pass through Finningley. At little cost it could be made into a useful route connecting up the Great North Road with the towns of Thorne, Goole and Hull, and the important new bridge over the Trent at Keadby, which gives direct access to Grimsby and Cleethorpes and a large portion of Lincolnshire. Heavy char-a-banc traffic to Cleethorpes during the summer season makes use of this road more and more each year.

The road also forms an exceedingly useful bye-pass for through traffic going north of Doncaster, as it connects at Selby with the main road from Doncaster to York. It would thus relieve the streets of Doncaster of a large amount of heavy motor lorry traffic passing through it to the north and north-east. It would further form a useful road from London to Hull whenever the proposed bridge at Boothferry is constructed, as it would shorten the distance from London to Hull by about twenty miles.



The old Butter Cross and High Street.



The entrance into High Street from Lincoln to Great North Road.

BAWTRY

ADDENDUM—*Sheffield to Doncaster* [see No. 8].

Recent road proposals now being considered by the Sheffield Corporation seem to open the way, in co-operation with the Rotherham Region Joint Town-Planning Committee, for an additional route from Sheffield to Doncaster, avoiding Rotherham on the one hand and passing Maltby on the other, and joining the main road at Edlington. In the first instance, the route followed between Wickersley and Old Edlington might be via Maltby, leaving the short cut to be developed later, provided that the site for it is reserved now. This would fit in very well with the proposals for the Doncaster Region, and the Local Authorities concerned are recommended to preserve the line of route which chiefly comprises the improvement in width, level and direction of existing country roads, and in view of this it is recommended that the Old Edlington Road (G) should be widened to main road width, viz. 120 feet between hedges with building lines set back 40 feet at either side from the road.

II.—REGIONAL ARTERIES

The presence of a number of Arterial Roads which are generally good hard stone roads, well kept in the past, has helped very materially in the development of the surrounding districts; they form a series of Roads chiefly centring on the Town of Doncaster, and used in the old days to obtain access for marketing purposes. With the advent of the new collieries, the traffic carried by many of these roads is now very considerable. Generally the width of all Arterial Roads should be 80 feet between fences, with building lines set back 40 feet from the fences.

(A)

THE SPROTBOUGH ROAD

(DONCASTER to SPROTBRO', MELTON, MEXBORO', BARNBORO', &c.)

This road leaves the Great North Road just beyond the outskirts of the Borough of Doncaster, is already a good width, and can easily be widened as required to a width of 80 ft. with a building line of 40 ft. It is being used more and more every day as an alternative to the Barnsley (No. 7) Road for traffic going to Goldthorpe, Bolton-on-Dearne and adjoining district.

After leaving Doncaster the road for a short distance is low and has been covered with water in heavy flood times. It is, however, only a matter of small cost to prevent this from recurring. After passing Sprotbro' (where the proposed Ring Road would intersect) it is somewhat narrowed, and requires widening and corners straightening out as far as Melton, where the road to Mexboro' intersects. If the road corners here were properly widened out a very good alternative route to Mexboro', avoiding Denaby and Conisbro', would be made. After leaving Melton, the road passes through Barnborough on to Goldthorpe, the whole requiring strengthening.

The length of the road in the Doncaster Regional Area is about $6\frac{3}{4}$ miles.

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(B)

THE BARNBY DUN ROAD

(To KIRK SANDALL, BARNBY DUN and STAINFORTH)

This road leaves Thorne Road (No. 6) about two miles east of Doncaster, from which point it is too narrow altogether for the existing heavy traffic: as it must shortly carry a very much heavier axle load it should be as soon as possible widened to 80 ft., with 40 ft. building lines. At the junction of the road to Long Sandall, where a very bad blind corner exists with a Railway Bridge over, the road should be widened out at once. At Kirk Sandall at the intersection of Brecks Lane (which forms the main road to the New Village) a bad corner exists which should be widened out immediately. Near Barnby Dun Station it connects to the proposed Ring Road, and turns through the village of Barnby Dun to Stainforth.

(C)

THE BLAXTON AND FINNINGLEY EAST TO WEST ROAD

(To RIVER TRENT at OWSTON FERRY)

Leaving the Great North Road at Cantley corner two miles south of Doncaster, this road turns easterly and intersects the proposed Ring Road near Cantley schools. Up to this point the road is fairly wide, but with two sharp corners which require easing. From Cantley schools the road becomes very narrow passing through Branton, where a dangerous corner exists which should be immediately widened; further there is a bad bridge over the River Torne, and a further dangerous turn at Awkley, after which the road is again wider to Finningley and Blaxton.

The whole length of this road requires widening, and in some places old property must be demolished to do this.

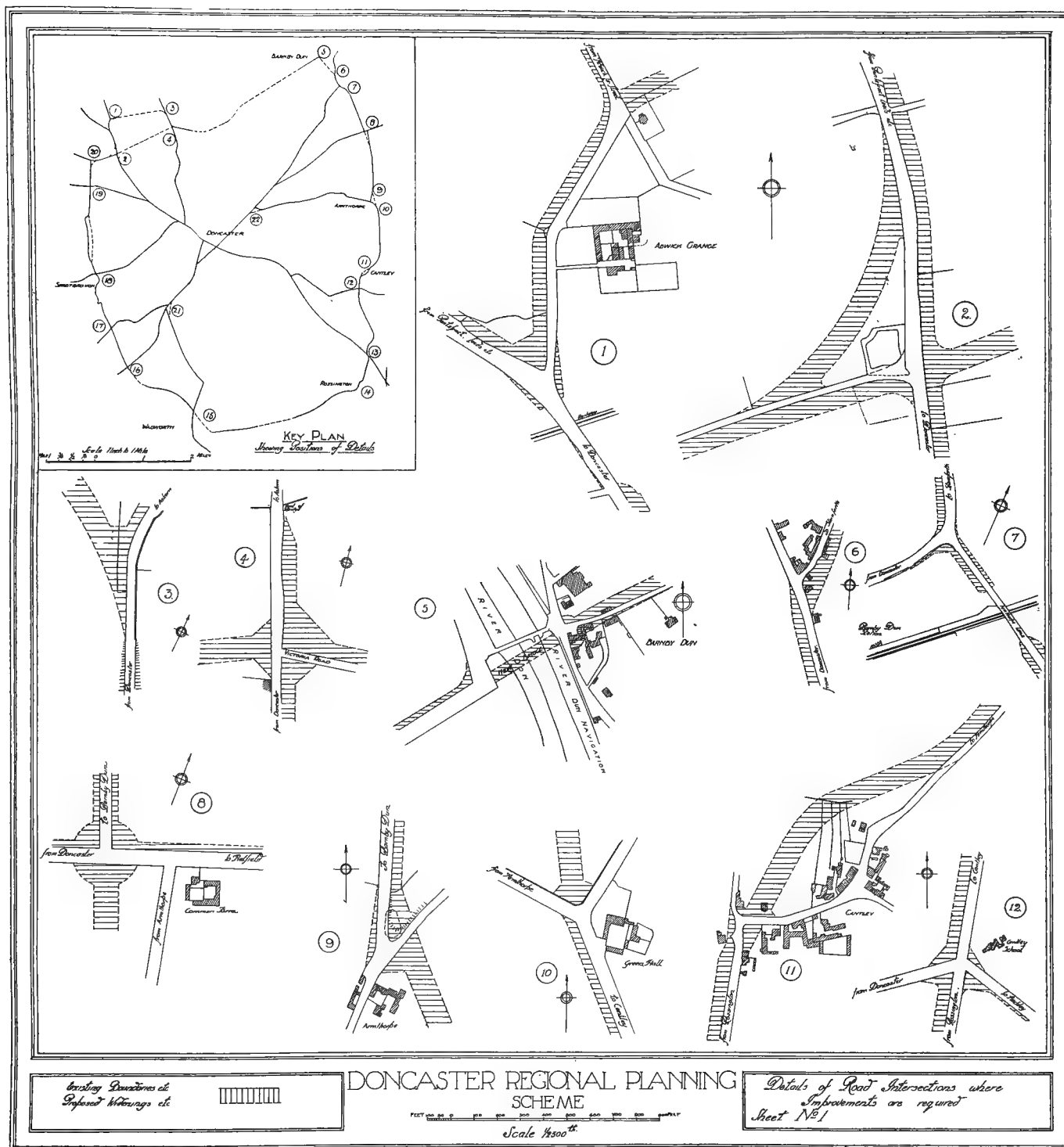
(D)

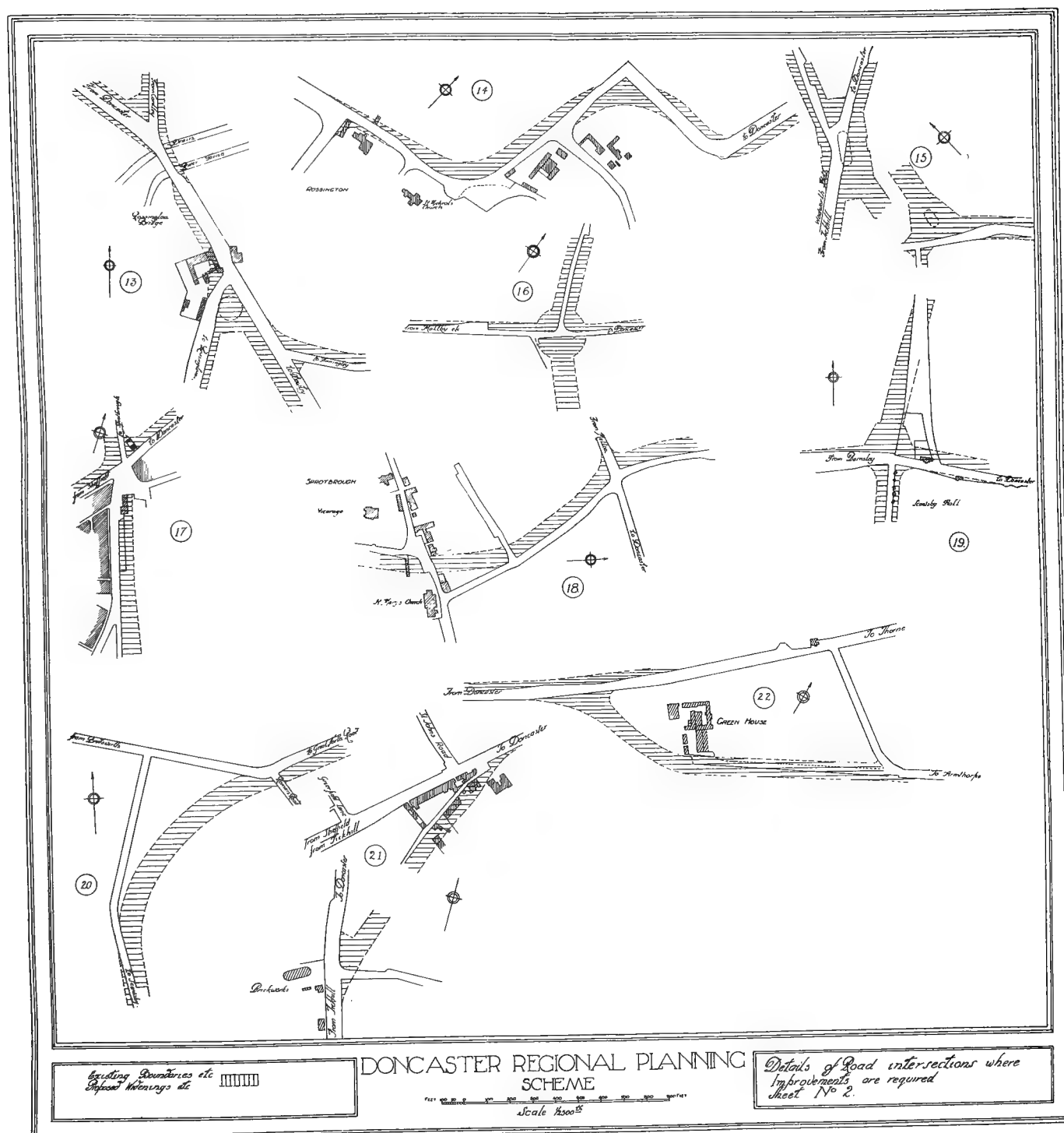
ROSSINGTON BRIDGE TO FINNINGLEY

(From the GREAT NORTH ROAD to the TRENT)

Leaving the Great North Road at Rossington Bridge three miles south of Doncaster, this road, at present narrow in a few places, could be most advantageously used as an approach road to Finningley, Blaxton and direct to the River Trent. In many places the road has long wide stretches of grass on either side which could be used for widening purposes as the traffic increased. The proposed width of this road is 80 feet between fences, with building lines set back 40 feet.

The distance from Doncaster to Finningley by this road is exactly the same as by Cantley and Awkley, and it would be much safer for traffic than the direct road by Cantley (C), which in spite of improvements would remain an indifferent through route.





(E)

CONISBRO' TO MEXBORO'

(From the SHEFFIELD ROAD to MEXBORO')

This road, leaving the Sheffield Road (No. 8) at the foot of the steep Conisbro' Hill, where a dangerous turn and corner exist (requiring immediate attention), proceeds round the foot of the Castle Hill past Conisbro' Railway Station, over a level-crossing at Denaby and into Mexboro'. The road is altogether too narrow for the traffic it carries and, owing to the natural obstacles it offers, would necessitate very expensive widening, being built up on both sides and forming the main street of Denaby. It is suggested that the road should be left as at present and a New Road (No. i., page 44) be constructed to take traffic from Mexboro' and Denaby to join the Sheffield Main Road at a point half a mile west of Conisbro' about halfway between Conisbro' and Conisbro' Hill top.

(F)

THE ARMTHORPE ROAD

(From DONCASTER to ARMTHORPE COLLIERY VILLAGE)

This road leaves Thorne Road (No. 6) about $1\frac{1}{2}$ miles east of Doncaster by a very bad right-angle narrow road called Armthorpe Lane. It is necessary that a better connection should be made, and this is provided for by the proposed by-pass road referred to elsewhere.¹ This road is very narrow throughout its entire length and, owing to the heavy traction engines which use it daily, it is practically impassable for light traffic. In the very near future the new colliery at Armthorpe will be completed and the new colliery village there will use this road as its chief means of access to Doncaster. It must shortly be called upon to carry either motor bus or tram traffic. The road can easily be widened on either side and should be made 80 ft. between hedges, with a building line of 40 ft. set back from fences.

The district appears to be likely to develop rapidly into an Artisan Housing Area, for which it is exactly suitable.

(G)

THE OLD EDLINGTON ROAD

(From DONCASTER to OLD EDLINGTON, BRAITHWELL and MALTBY)

This road leaves the Sheffield Road (No. 8), at the Balby tram terminus on the Balby High Road, and carries a considerable traffic to the colliery village of Maltby.

On leaving Balby the road is somewhat narrow and should be widened throughout its entire length. It could thus easily be made into another approach to the New Edlington Colliery Village, the present approach to which (by Warmsworth) is very unsatisfactory. Just before reaching Broom House the proposed Ring Road is intersected. At Old Edlington a bad hill is met with, which might

¹ See No. iii., page 46.

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easily be regraded. Above Old Edlington the intersecting road corners to Conisbro', Stainton, Micklebring and Maltby require widening and opening out. At present they are very dangerous to traffic entering or leaving any of these roads.

Beyond this point the road to Braithwell is very narrow and should be widened. At Braithwell village a short bye-pass is suggested to avoid the right-angle bends of the road and the narrow village street. The road forward to Maltby should be widened and a short length of New Road made near Lambcote Grange, where an exceedingly dangerous corner exists.

The proposed width of this road is 80 feet,¹ with building lines set back 40 feet from the fences.

(H)

THE HARWORTH ROAD

(ROSSINGTON to HARWORTH, BAWTRY and TICKHILL)

Leaving Rossington near the Vicarage, where a dangerous corner requires immediate widening, the road runs midway between the Great North Road and the Worksop Road (No. 4). At Tickhill Spital it intersects the Road from Bawtry to Tickhill, Rotherham and Sheffield. From Tickhill Spital the road requires widening to Harworth, and going forward south it joins Road (No. 5) north of Blyth, just outside the Doncaster Regional Area.

The proposed width of this road is 80 feet, with building lines set back 40 feet from the fences.

III.—PROPOSED NEW ROUTES AND CONNECTIONS

No. i.

CONNECTING THE TOWN OF MEXBORO' TO THE NORTH WITH ROAD NO. 1, AND SOUTH WITH ROAD NO. 4

The Mexboro' Urban District, although small in area, is already a large industrial centre and in the future will play an important part in the Don Valley industrial development owing to its numerous railway and waterway connections and the fact of its being the shopping centre for the immediate district, comprising a large number of small villages, served by buses and trams running into the Town.

With regard to the question of dealing with the congested state of the Main Street of Mexboro', it is felt that the natural difficulty of the levels makes this impossible on the south side of High Street, so that it must be widened entirely on the north side and widening continued on the same side of the road along Main Street.

At the present time through traffic entering and leaving Mexboro' must travel a long way round before reaching the trunk roads. To deal with this, and to connect Mexboro' up with the surrounding districts better, it is felt that the best course would be to construct a Road connecting Mexboro' with the Main Roads running North and South.

It is proposed to utilise existing Roads (which follow the old pack-horse tracks)

¹ The suggested road from Sheffield to Doncaster (see Addendum, p. 41), avoiding Rotherham, would require this road from Edlington to Doncaster to be 120 feet wide.

as far as possible, the only new sections of road necessary (excluding the bye-pass road at Conisbro', Road No. ii.) being about one mile between Mexboro' and Road No. 1, and about one mile of new road between Mexboro' and Road No. 8.

Generally the width of all proposed new routes should be 80 feet between fences, with building lines set back 40 feet from the fences.

Connection of Mexboro' to the North.

Leaving Mexboro' (on the site of an old Roman Road now used as a footway) running due north, and utilising Harlington Lane for a short distance, the proposed road would intersect Mill Lane at Harlington Mill; a new section of road about three-quarters of a mile long would be necessary after leaving Harlington Mill; the road would follow Mill Lane to Harlington Village. At this point the Sprotbro' Road intersects and would require corners widening out. After leaving Harlington the road would pass over the Dearne Valley Railway by an existing bridge and continue forward to Barnborough, where a short length of road would be required to bye-pass part of Barnborough Village. On leaving Hickleton it would cross the Barnsley Road (No. 7) and proceed by Bilham Grange to Brodsworth through Pigburn to the Red House, where it would intersect the Leeds and Bradford Road (No. 3), and connect up with the Great North Road (No. 1).

Connection of Mexboro' to the South.

Leaving Mexboro' the road would proceed along Ferry Boat Lane and cross the canal by the existing bridge. A new bridge would be necessary to carry the road over the River Don (on the site of the Ferry there), afterwards passing over the G.C.R. by the existing level-crossing. The road would be carried through Old Denaby by a short section of new road, and be curved slightly to rise up the hill, following an old route, through Denaby Wood to Denaby Thick (wood), where a short length of new road would connect to the Sheffield Road (No. 8) at a point between Hill Top and Mount Pleasant, where the proposed Conisbro' bye-pass road intersects Road No. 8. From here the proposed road would run on the Conisbro' bye-pass road to the Clifton Hill and Carr Lane, continuing forward to Old Edlington, where it intersects the road from Doncaster to Maltby, and forward to the Ring Road to the east of Wadworth.

At Maltby a connection would be obtained to the Worksop Road (No. 4).

No. ii.

CONISBRO' (BYE-PASS)

The Sheffield Road (No. 8), after leaving Doncaster, keeps to the high ground. At Conisbro' a very dangerous hill, with cross-roads entering at a very steep grade, exists. Both sides of the road are built up, and any widening would be costly, and at the same time would not do away with the dangerous character of the hill.

It is proposed to construct a Bye-pass Road two miles long. The proposed road would leave the Sheffield Road just beyond the bridge which crosses the Dearne Valley Railway, and would hold to the high ground intersecting the road from

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Edlington to Conisbro' on the level. Proceeding forward it would pass at the rear of the brickyard and cemetery and would again connect with the Main Road No. 8 at a point halfway between Mount Pleasant and Hill Top.

No. iii.

*ARMTHORPE LANE (BYE-PASS)*¹

The road to the new colliery village of Armthorpe at present leaves Road No. 6 near the corner of Greenhouse and is dangerous for traffic entering or leaving this main route. It is proposed to construct a short length of new road, a little over a quarter of a mile in length, on the site of an old footpath which passes the front of Greenhouse ; by this means two very awkward and dangerous corners would be removed.

No. iv.

BALBY (BYE-PASS)

The congested state of the Balby Road at the junction of Roads No. 4 and 8,² coupled with the very narrow part of Road No. 4, where it forms the village street of Balby, make the provision of a New Road an immediate necessity so that the dangerous corners in Balby may be avoided.

The proposed road, a little over half-a-mile long, would leave Road No. 8 near the White Swan Inn, going forward on the site of Balby Back Lane to Woodfield Lane, afterwards proceeding direct to Road No. 4, which it would intersect at the corner of Common Lane : the portion of entirely new road being slightly under a quarter of a mile in length.

IV.—SUGGESTED RING ROAD

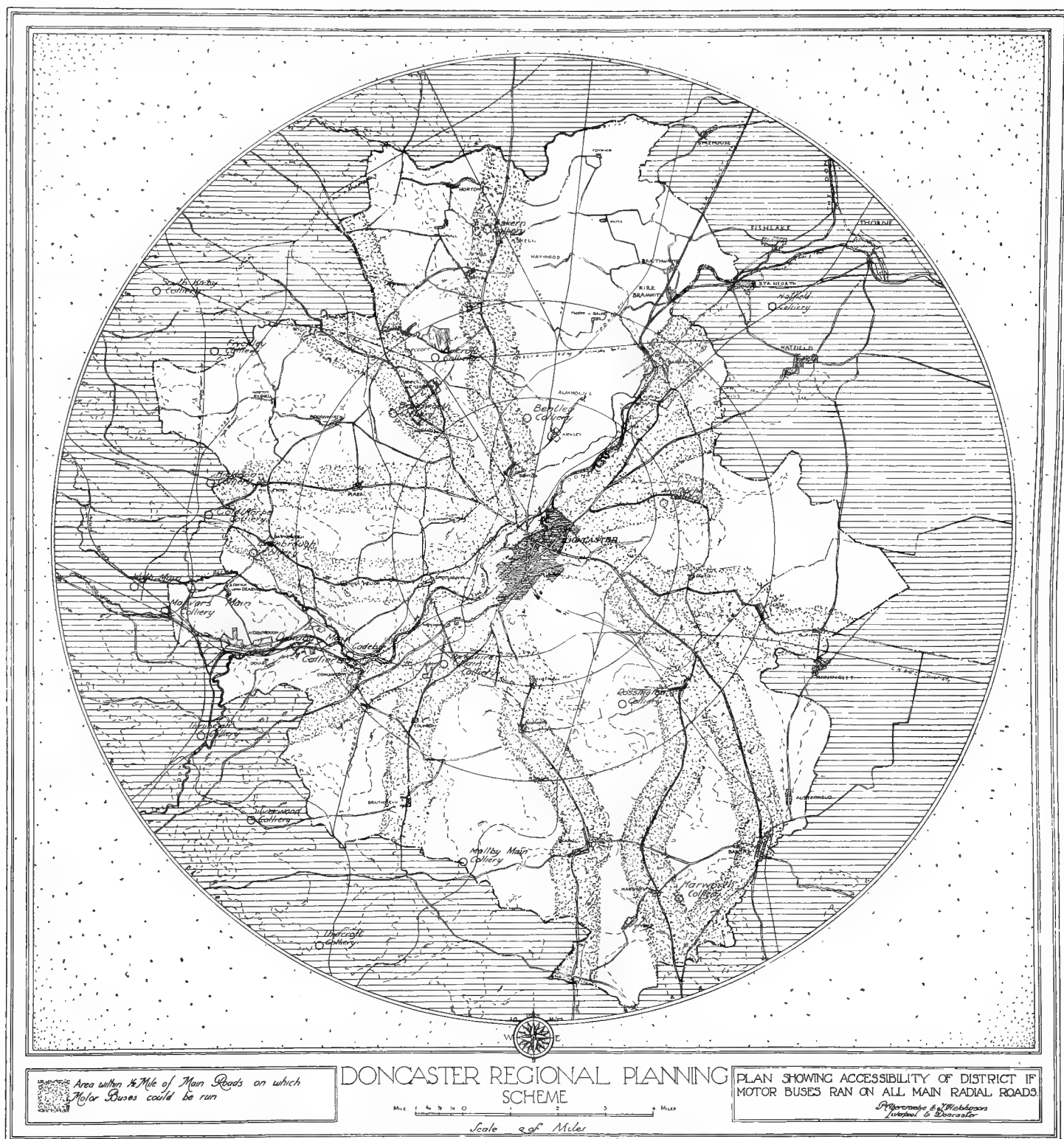
*LINKING UP THE EXISTING AND SUGGESTED COMMUNITIES ROUND THE TOWN OF DONCASTER*³

It is hardly necessary to emphasise the need for some form of circumferential communication in a region which, as may have been gathered from the former sections, is admirably well supplied with radial routes. The actual object of a Ring Road is two-fold : firstly, to form a direct communication between self-contained communities most of which find themselves situated on one or other of the radial roads ; secondly, to act as a series of bye-passes for external traffic entering the Region in order to avoid passing through the centre of the Town of Doncaster, the main streets of which are already taxed to their utmost and would become impassable in a few years without the help of such relief. It will thus be seen that, as always happens in the case of a Ring, the density of traffic on its different segments will not by any means be equal ; accordingly, although it is desirable to have the Ring completed at as early a date as possible, certain sections of it are more urgently required than others.

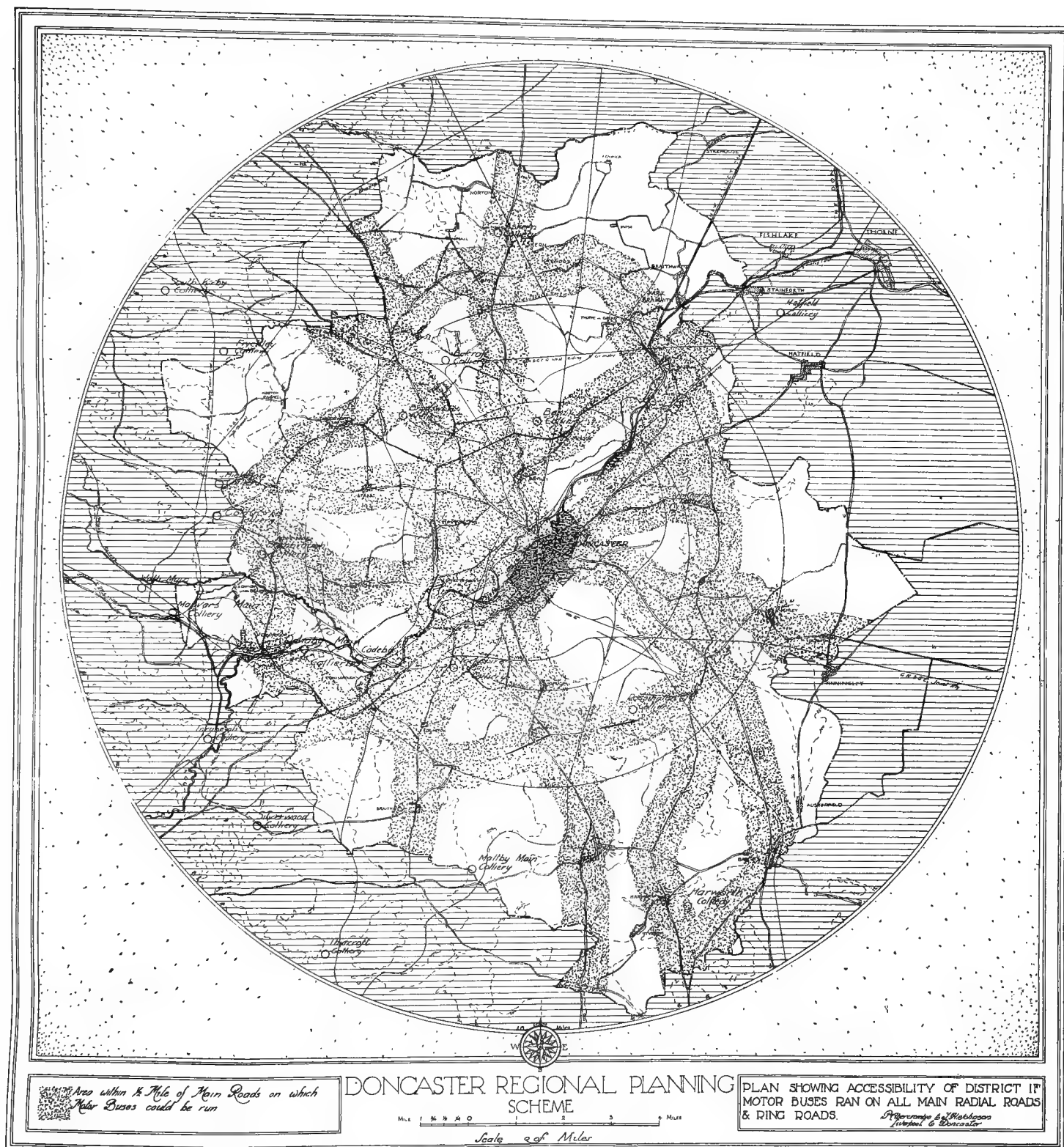
The saving in the wear and tear, upon routes already loaded up to their limit, which will be effected by a Ring Road would be sufficient in itself to justify the cost of

¹ This is now in course of construction, with a width of 72 feet, Plate X. No. 22.

² See Plate X. No. 21. ³ For details of the improvements required at various intersections of the Ring with other roads, see Plates IX. and X.



This diagram shows that if Trams or Buses ran on every important Road, there would still be large inaccessible areas.



The addition of two Ring Roads opens up a large amount of land at present inaccessible ; also provides intercommunication between outlying communities.

an entirely new route throughout its length. Fortunately the heavy cost of this is largely avoided by the fact that a fairly continuous Ring can be obtained by utilising existing roads, widening where necessary, and for the present maintaining the use of the railway and river bridges. Without sacrificing utility it is possible to avoid the expenditure of a vast sum of money, as has been the case in other towns, and yet to produce a well defined Ring Road, which will meet all the requirements of the various new communities for some generations to come, so far as it is possible to foresee at the present time.

The proposed Ring Road at certain points makes use of the existing Main Trunk Roads for short distances. While realising that radial roads should not be called on to bear circumferential traffic, it is felt that the high cost of road construction makes it necessary to use existing roads instead of making long lengths of new roads, even though the latter might produce a better circle.

Starting from the Great North Road, south of Doncaster, the Ring in its eastern half branches off near Rossington Bridge by the corner of Whyn Hill Plantation. After crossing by the existing bridge the G.N. and G.E. Joint Railway, it uses the existing Warning Tongue Lane as far as the village of Cantley, the narrow street of which is avoided by a bye-pass which joins the existing Nutwell Lane, north of the village. Still going almost due north, the road passes to the east of Armthorpe Village and again joins up with Hatfield Lane to the Doncaster to Hatfield Road (Radial No. 6), avoiding the hit and miss crossing at Common Farm. North of this it follows the Armthorpe Lane, skirting the eastern extremity of Messrs. Pilkington's new village of Kirk Sandall, and crossing the G.C.R. by the existing bridge. At the village of Barnby Dun the Ring turns to the right at the 'White Hart,' removing some old cottages, passing the new Housing Scheme, and turning down Madam Lane in a straight line to Barnby Dun Bridge foot: this involves the demolition of the old cottages in Madam Lane.¹

After crossing the Don the road cuts straight over the low-lying land, passing the village of Almholme, and then on a curve past Arksey, across the Great Northern Railway by a new bridge, and enters the village of Bentley just south of the Bentley Colliery. From this point to the Great North Road is one of the most debatable sections of the Ring; clearly the simple course would appear to be to cut straight across the Great Central and Hull and Barnsley Railway, and the Great Northern Railway lines, to Green Lane which enters the Great North Road south of Woodlands, where the old quarries are situated. This route would necessitate two new railway bridges. Another line would bring the Ring out north with a sweep wide enough to include Adwick-le-Street, and using Bentley Moor Lane and Doncaster Lane: with the exception of improvements of corners at White Cross Bridge this route is at once available. The third line is a middle course between these. Like the preceding it produces a bulge and has the disadvantage of utilising for a distance of about a furlong the Great North Road both for radial and circumferential traffic. This route only requires one bridge. Probably the second route best meets present requirements.

The western part of the Ring beyond the Great North Road turns almost due south, utilising Scawsby Lane up to the point where the latter crosses the South York-

¹ Plate IX. Nos. 5 and 6.

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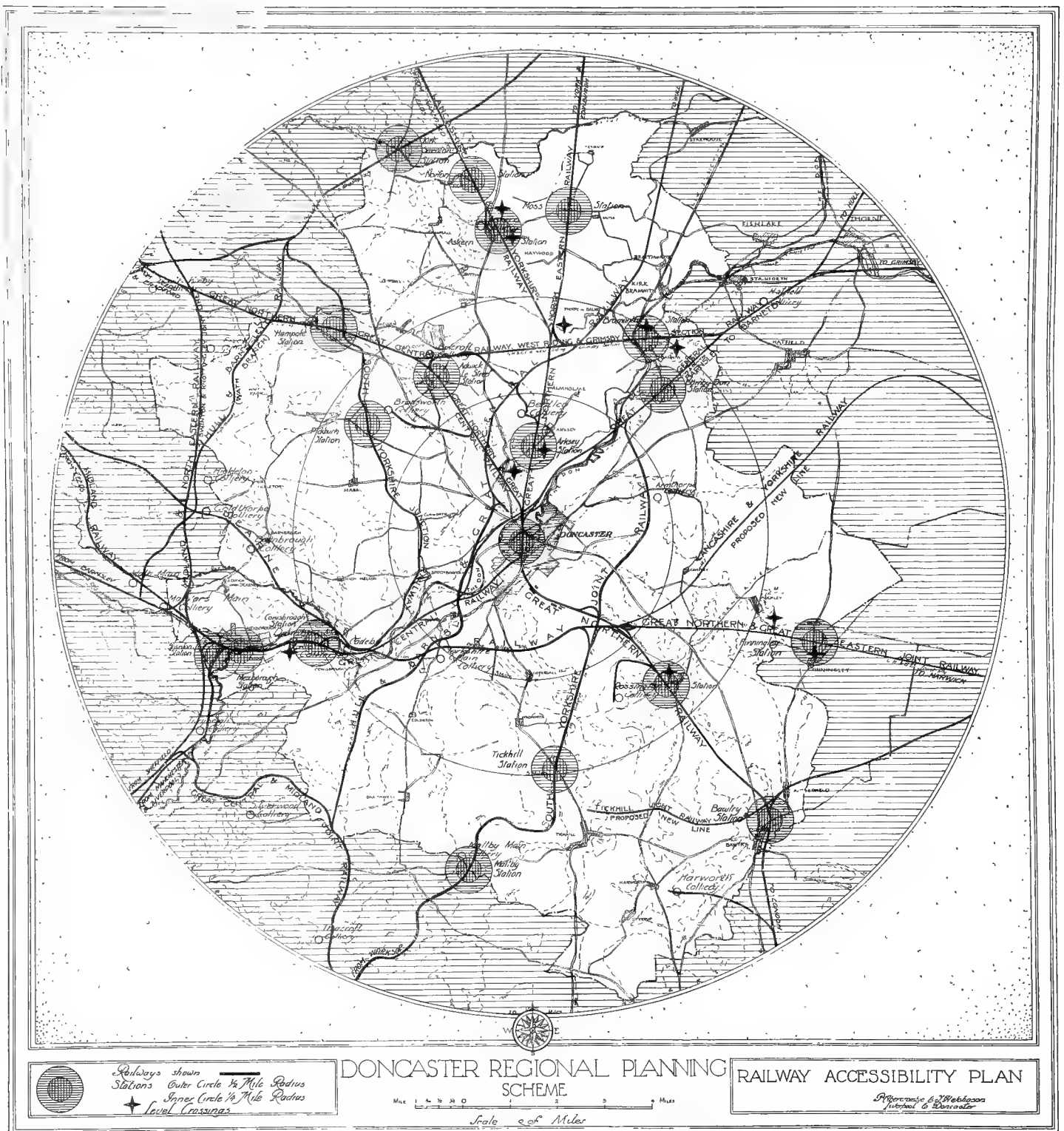
shire Junction Railway. Instead of widening the lane beyond the railway, the Ring Road is kept on the eastern side of it, thereby avoiding two narrow railway bridges and eventually crossing the Sprotbrough Road. The lane on the west of the railway and the two narrow railway bridges could of course be used until the new route was constructed, but it would be inadvisable to spend money on their widening. The same applies to Sprotbro'; the valley of the Don here is the only serious natural obstacle which the Ring Road has to deal with in the whole course of its route. For the time being the existing road through the village, the bridge and hairpin bends on the south side could be used, until a bye-pass and new high-level bridge or viaduct were constructed on the line shown.

Both routes combine at Mill Lane, crossing the G.C.R. by the existing bridge and the Sheffield Road (No. 8) at Warmsworth. Lords Head Lane to the east of Yorkshire Main Colliery is then utilised as far as the Edlington Road (G), at which point a new connection joins up with Wood Lane and Whitecross Lane, skirting Edlington and Wadworth Woods. The village of Wadworth itself is bye-passed and, from this point, the Ring goes nearly due east, utilising portions of old lanes and crossing the South Yorkshire Joint Railway (existing narrow bridge) to the south of Rossington New Village; thence, by the level-crossing over the G.N. Railway, it enters Rossington Old Village. It has been found impossible entirely to bye-pass the latter, but a fairly good route, cutting off a big corner opposite St. Michael's Church, is possible, eventually connecting up to the Great North Road (No. 1) at Rossington Bridge by Sheep Bridge Lane.

It is perhaps needless to say that all existing routes utilised by the Ring would require widening, but if this route is carefully studied on the map it will be seen that, with comparatively short connecting links and local improvements, the Ring could be brought into existence. The subsequent widenings and rebuilding of railway bridges would proceed at later dates as occasion permitted. The road is proposed to be eventually 120 feet wide between the hedges, and 40 feet building lines are also recommended. This width would of course be modified where the road passed actually through villages such as Rossington, but in all cases a carriage-way of at least 40 feet should be aimed at.

A shorter route for this Ring Road might possibly have been devised on the north, crossing the Don on a line somewhere between Armthorpe and Arksey. However, the wider sweep suggested appears in every way preferable.

An outer Ring on the north and west could be planned, utilising, on the west, the new route (No. i.) from the Ring at Wadworth through Mexboro' to the Great North Road at Red House. From here a new route to Barnby Dun can be obtained with a small amount of new road construction. For about half a mile the Great North Road is used, leaving it at the five cross-roads beyond Humber Head Bridge: thence by Burghwallis, bye-passing Sutton, crossing Trunk Road (No. 2) south of Askern, and so to Rushy Moor House. The route then goes through Haywood and Trumfleet, passing near Thorpe-in-Balne, and continuing by the side of the Don to Barnby Dun. From Askern Road to Barnby Dun one short length of new road, and improvements at Haywood and Trumfleet, are all that is necessary to make the route through the Agricultural belt at once available. The width through the Agricultural belt should be 60 feet.



(B).—*RAILWAYS*

I.—*MAIN LINES*

THE Railways serving the Doncaster Regional Area are as below :—

- The Great Northern Railway.
- The Great Central Railway.
- The Great Eastern Railway.
- The North-Eastern Railway.
- The Midland Railway.
- The London and North-Western Railway.
- The Lancashire and Yorkshire Railway.
- The Hull and Barnsley Railway.

The Great Northern Railway is the chief main line of the district both as regards goods and passenger traffic. It forms one of the main links of the East Coast Railway Service of England and Scotland and provides an unequalled service of main lines running through the Doncaster Regional Area, giving direct access to Leeds, Bradford, Wakefield, and the West Riding towns, in addition to being the main line to London and Scotland.

The Railway Station at Doncaster, the hub of this system of Main Lines, from which all passenger trains arrive and depart (about 240 trains making use of the one station daily), is totally inadequate for the amount of traffic handled, and a very much larger station is required, together with the widening out of Balby Railway Bridge which forms a bottle-neck entrance to the station.

Just south of Doncaster, on the Carr,¹ there is a huge network of junctions and sidings belonging to this railway, and on both sides of the line there is an area of several hundreds of acres of Carr land adjoining, which being perfectly flat is eminently adapted for works sites, although unsuitable for any other purpose owing to its being low-lying.

The Great Central Railway forms the main line between the East and West Coast, Hull and Liverpool. In addition to giving access to Sheffield and Manchester and to Lancashire generally, it probably carries the largest amount of the mineral traffic of any railway in the district, to cope with which it has recently constructed an avoiding line between Warmsworth, west of Doncaster, and joining the main line again just east of Doncaster. This line practically forms a railway bye-pass through Doncaster Station for mineral traffic coming from the West and proceeding to the East Coast ports of Hull, Grimsby and Goole. Adjoining this company's line are large areas of land most suitable for works sites requiring both rail and water

¹ As the low-lying land is called.

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connection. Suitable provision should be made for tapping the land on the Wheatley side, and any provision of new bridges crossing the river or canal should be wherever possible designed to carry both road and rail traffic. A suggestion of bringing coal direct from the collieries to a depot close to the town of Doncaster has many advantages both as regards reduction of cost and facility of handling the Town's supplies.

The Great Eastern Railway (the Great Northern and Great Eastern Joint Line to March) connects the Eastern Counties and also Harwich. The Great Eastern Railway has running powers to York on the North-Eastern Railway and forms an excellent connection to the Continent in addition to its great use as a passenger-carrying line. A large mineral traffic is carried by this railway from the South Yorkshire Coalfield.

The North-Eastern Railway (the East Coast Line), commencing at Shaftholme Junction about $3\frac{1}{4}$ miles north of Doncaster, forms the connecting link for all passenger and goods traffic going north and north-east of Doncaster which must be handled by this company's system. The service for passenger and goods traffic is good.

The Midland Railway, by whose system the West of England is reached, has not a good service of trains to or from Doncaster either as regards passenger or goods traffic. Although somewhat improved recently, the service still leaves a good deal to be desired before it can be said to meet, in anything like a satisfactory manner, the needs of this area, which appear to have been largely ignored by this company in the past.

The London and North-Western Railway Company have in the past used the Doncaster Area very little for passenger traffic, except for a few through trains occasionally. It may be said this company has been of little use except for goods traffic. However, now that the fusion has taken place between this company and the Lancashire and Yorkshire Railway Company, a good train service may be expected.

The Lancashire and Yorkshire Railway recently merged with the London and North-Western Railway Company, whose line connects at Shaftholme and runs through Askern to Knottingley, etc., has not in the past given as good a passenger train service to this area as the district warranted; a more frequent train service is required urgently for Askern, the present service for a population of about 4000 being totally inadequate. It, however, forms another means of access to Lancashire, Leeds and the West Riding towns, and carries a large quantity of goods and mineral traffic.

The Hull and Barnsley Railway Company, which connects the Regional Area to the Port of Hull, forms a direct means of exporting coal.

II.—LOCAL TRAIN SERVICE

The railway service of the Region is very full in respect of main lines but it is poor with regard to small Stations, which occur only at infrequent intervals; and, although splendidly served with fast passenger trains from Doncaster itself, the surrounding Region in many parts is difficult of access. Small railway stations

appear to have been put down with a view of making one station serve a number of villages, and while this method might have been satisfactory in the past when the Region was purely an agricultural one, now that it has changed into a thriving industrial area a broader policy is necessary, and additional stations are required particularly at the following places :—Bentley, Sprotbro', Bessacarr, Harworth.

Many of the large industrial communities of the district are without adequate train services, and a better service is necessary, among others—

To Askern.

To Conisbro', Mexboro', etc.

To Barnby Dun, and Stainforth and Hatfield.

To Adwick-le-Street and South Elmsall.

To Rossington.

To Adwick-on-Deane, Barnborough and Hickleton.

To Wadworth, Tickhill and Maltby.

The districts of Wadworth and Tickhill are to-day extremely badly served by railway ; the latter has three trains a day. The new railway which runs through this district (constructed only a short time ago) appears to have been almost designed to avoid being of any local service, as the railway station is about two miles from each place.

Shortly before the war a line was projected by the Great Northern Railway running from Bawtry to Tickhill, the land for which has already been purchased. However, owing to the war the work was not proceeded with, but it is felt that this railway should be constructed with as little delay as possible, as it would then give Tickhill a convenient access both north and south, which should be of inestimable benefit to it. There is no doubt that Tickhill owes its present unfortunate position largely to its lack of foresight in the past, in objecting to the construction of the Great Northern Railway main line through this district, the results of which are apparent.

III.—MINERAL LINES

The mineral lines which in many cases connect the collieries with the main lines of railways have not been in the past made use of for ordinary passenger service. This opportunity, although primarily for the decision of the various railway companies concerned, appears not to have been fully realised.

The mineral line to Brodsworth Colliery, forming a spur off the Great Northern main line at Castle Hills Junction, might with advantage be made to serve as a passenger line to Brodsworth. At present the only means of access to Doncaster from Brodsworth is by electric trams, which cannot be considered as adequate for this portion of the township with a surrounding population of about 7000.

IV.—LEVEL-CROSSINGS AND BRIDGES

Railway level-crossings exist in the Regional Area although not to such a large extent as might be expected in so flat a district. The following, however, are placed

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in dangerous positions, and should be removed and bridges substituted as soon as circumstances permit of this :—

The Askern crossing, severing the Doncaster and Selby Main Road.

The Askern Station crossing, intersecting the town of Askern ; a footbridge is required here at once.

The Rossington crossing, where a footbridge is now badly needed over the Great Northern main line.

The Arksey Great Northern main line crossing, where a footbridge is urgently required.

The Watch House Lane Great Northern main line crossing at Bentley.

The Railway crossing adjoining Norton (L. & Y. Rly.) Station.

Kirk Bramwith and Stainforth Road crossings (West Riding & Grimsby Rly.) near Barnby Dun.

Finningley Station and Finningley Road crossings (G.N. & G.E. Joint Railway).

There is a matter of vital importance to be considered in the construction of any future Railways in the Regional Area. In the past Bridges carrying Roads of the utmost importance over Railways have been constructed much too narrow for present traffic. Although the width of these Railway Bridges may comply in all respects with the Standing Orders, it is very necessary, in the case of all Main or Trunk Roads, that the width of Bridges should be not less than the width of the road itself, minus grass strips. An object lesson of the mistake of not doing this can be found on the Great North Road just south of Doncaster where, despite the efforts of the Local Authority, the road has been so narrowed by the construction of the Railway Bridge that within the next few years a serious obstruction will be caused and the Bridge will require widening.

(C).—*WATERWAYS*

THE principal waterway of the region is, of course, the River Don. This, as is well known, is a Derbyshire torrent which, even where it passes through Sheffield, preserves this character, with a wide stony shallow bed and alternations between a slender trickle and a raging flood. By the time, however, that it has reached the Doncaster Region it has lost much of this aspect, and the extremely level country through which it passes for miles has the effect of adding a dignity to its flow. Beyond the confines of this region, after leaving Kirk Bramwith, the Don formerly appeared to lose itself in the flats bordering on the Ouse and Trent: a marsh at best, at worst it became a lake, flooding the land around for miles and losing thousands of acres to productive agriculture. Two main channels appeared, dividing at Thorne: the western to empty into the River Aire before its junction with the Ouse; the other following a devious course past Crowle to enter the Trent near its mouth at Adlingfleet.

The first move, then, towards an artificial treatment of the Don came from a project to curb this flooding and divert the final stage of its course: it was drainage rather than navigation that actuated Cornelius Vermuyden, the Dutch engineer-merchant, who undertook to reclaim land as a speculation in the reign of Charles I. His first project was to cut off the Trent arm by building a bank south and west of Thorne, thereby inducing the Don to concentrate upon its channel to the Aire. This was not successful—for, while freeing the levels east of Thorne, he flooded the other side of the Don towards Fenwick and Sykehouse, the Aire being unable to cope with the concentrated waters of the Don. Nor did his local drainage of the levels appear satisfactory: the little river Torne which drains the cup south of Doncaster, issuing at Rossington Bridge, and the Idle River were carried at right angles towards the Trent at Althorpe and Keadby. It would seem that a more satisfactory solution would have been to gather the Don, Torne, Idle, and other drains into one channel flowing diagonally across, along the line of the eastern arm of the Don, to Adlingfleet near the mouth of the Trent. This was not done: but after endless litigation and riots, the famous Dutch River was projected—a straight cut, about one mile before the Don joined the Aire, to the Ouse at Goole. Vermuyden had retired disgusted before this final solution was completed, which was done by his ‘participants.’ It is a really great work and after all to Cornelius Vermuyden remains the credit for boldly tackling this gigantic business of providing the Don with a proper outlet.

The moving force for the canalisation of the Don for the purposes of inland transport came from the opposite end, at Sheffield. As early as 1721 the need of a better water connection, by means of which goods could be carried to Hull, had become evident. But apparently the Corporations of Sheffield and Doncaster could

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not agree upon a joint scheme, and in 1739 a company took over the undertaking which is known as the Sheffield and South Yorkshire Navigation. At subsequent dates continual alterations and improvements were made in the course of the river: tortuous bends were first short-circuited, locks added, and then lengths of canal parallel with the river introduced. The finest length of artificial cut was that made from Doncaster to Barnby Dun and Kirk Bramwith, now known as the River Dun Navigation, which is really on the scale of a modern canal.

The most important departure from the channel of the Don as laid down by Vermuyden was the Stainforth and Keadby Canal, which once more opened the direct water connection with the Trent: not on the old diagonal line towards Adlingfleet, but almost due east and entering the Trent at right angles, near where Vermuyden had brought in his River Torne. For many years this remained the main Sheffield and Doncaster waterway, the total distance from Sheffield to Keadby being about forty-two miles, of which two-thirds was canal and the remaining one-third river.

In 1905 a most important addition was made to the Lower Don Navigation by the opening of the new Junction Canal, connecting up from near where the Keadby Canal branches, to the Knottingley Canal and so to Goole, running side by side with the Dutch River. Thus the orientation is again towards the Ouse.

This last addition is on an altogether larger scale than anything before attempted. Whereas by the Keadby route to Sheffield the boats are limited in length to about 62 feet, and capable of carrying about 100 tons, the new Junction Canal will take boats up to 130 feet length (being limited to this by the ship lock at Goole),¹ and capable of carrying 300 tons (some improvements would be necessary if these large boats became the regular traffic).²

Without dealing with the improvement of the waterway above Mexboro' and the difficult question of the locks at Tinsley, it would seem that the possible improvements might be grouped under three headings:—

(1) To carry the standard of the New Junction Canal up to Doncaster and there form extensive canal dockyards, warehouses, etc.: this would not be a very costly affair, as already up to Sandall Lock boats with a beam of 21 feet with a draft up to $8\frac{1}{2}$ feet are possible.

(2) To carry this standard up to Mexboro', which would be a much more costly undertaking, as the locks above Doncaster are only capable of taking boats about 62 feet long, and the river parts in this section would be particularly difficult of construction.

(3) To create a greatly enlarged ship canal on the scale of the Manchester Ship Canal, utilising probably the Dutch River (now tidal) and carrying it up to Doncaster.

It might be added that anyhow it would appear that the Keadby Canal is doomed, except for small boats requiring to pass up the Trent. To bring the section from Kirk Bramwith to Keadby up to the present standard of the New Junction Canal would require about a quarter of a million pounds.

¹ The only lock on the New Junction Canal at Sykehouse is 215 feet long.

² The 300-ton boat recommended by Royal Commission is 115 ft. long, 21 ft. beam, and $6\frac{1}{2}$ ft. draft.

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The Don Navigation has also valuable connections with other inland waterways—both outside the Region dealt with : on the west with the Dearne Canal, and on the east the Knottingley (already alluded to) connects with the Aire and Calder to Leeds and thence to Liverpool, thus linking the East Coast with the West.

It will thus be seen that while this district contains one good waterway with connections to other parts of the county, it is capable of being improved and enlarged up to the extent of a ship canal. It is well worth the expenditure of the sum required to bring transport by water on to the same level of capacity and efficiency already possessed by road and rail.

(D).—*PASSENGER TRANSPORTATION WITHIN THE REGION*

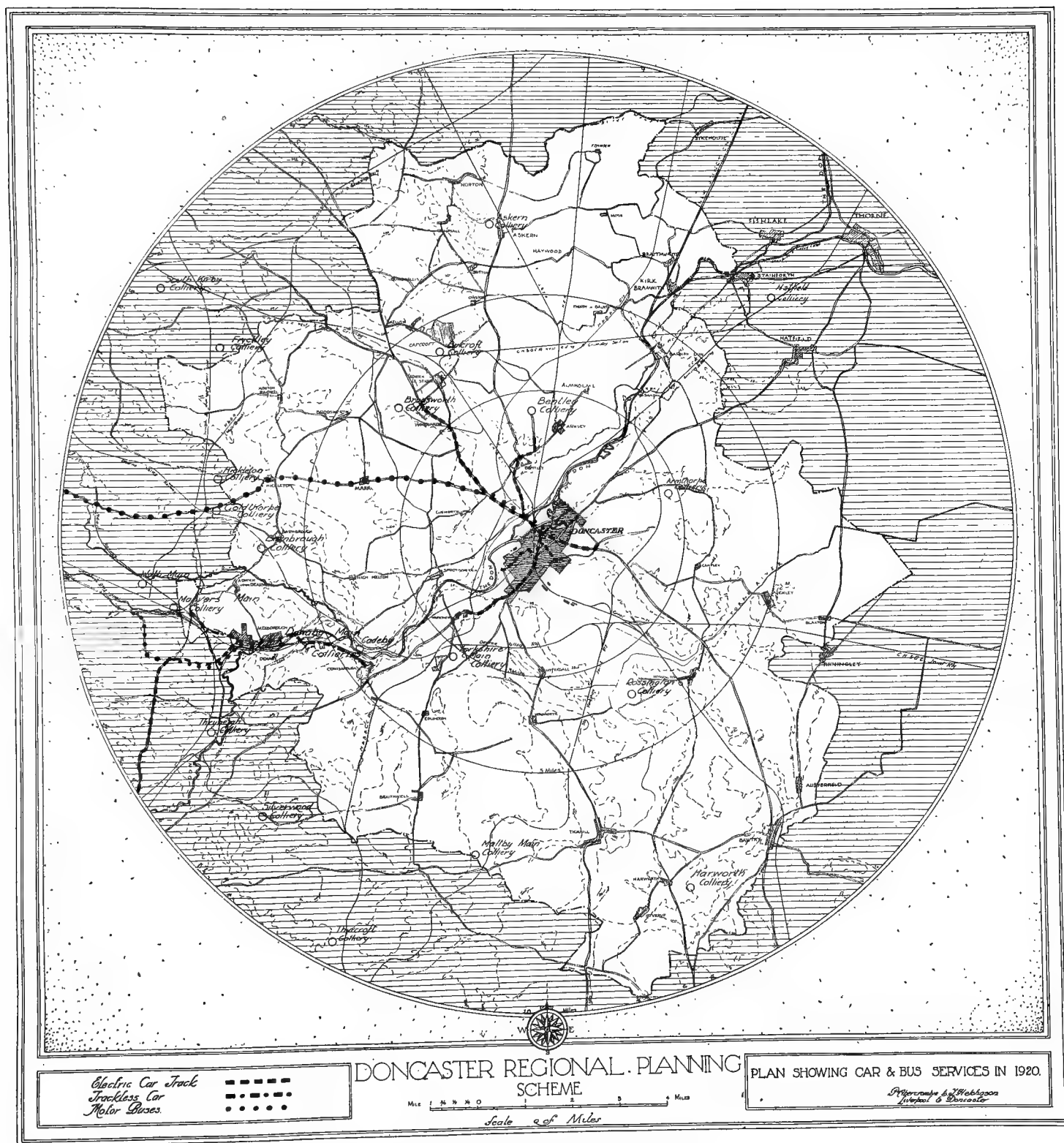
IT must have been obvious that one of the chief considerations in deciding upon the scattering of large residential units over the Region (instead of recommending a heavy concentration on Doncaster) was ease of movement from home to work. A comparison with London is always misleading except to show the drawback of unwieldiness, and the consequent amount of time wasted in trams, tubes, and buses. But Sheffield affords a much closer parallel: the heavy trades situated in the lower Don Valley form a long narrow factory area, projecting wedge-like from the centre of the town: its steep banks, particularly on the north-west side, prevented a normal residential development round the factory area, with the result that enormous numbers of workers in this district have to traverse the centre of the city to get to their work, the bulk of the town radiating from a core situated at one extremity of the valley. This defect is now being remedied, but it would be foolish to perpetuate a similar anomaly in the Doncaster Region. Given the factories located on the low-lying lands, the development of the fringes presents no physical difficulties and quite large communities can thus grow up near to their work-places. The formation of new villages attached to the collieries has already inaugurated this type of growth for the district. Wasteful travelling to and fro is thus reduced to a minimum.

A certain number of workpeople will probably prefer to live in Doncaster—they will have to make the daily journeys of an ordinary factory town—but the inhabitants of the ring of communities round it and fringing the factory areas should be able to walk to their work and home to lunch.

The system of intercommunication, therefore, will be required for special occasions rather than for normal diurnal journeyings. By special occasions may be meant social intercourse, the visits of strangers, occasional business or pleasure trips to the metropolis of the region—Doncaster. It must be added that transportation is also required for those workmen who settle in a village for the sake of a factory and subsequently change their place of employment: but this should be the exception rather than the rule.

It is not thought, therefore, that any special system of light railways is necessary to cope with huge volumes of traffic at certain hours; but rather an efficient motor bus system is required which should suffice for the more evenly distributed loads of occasional intercommunication.

Added to this, further suburban stations should be opened wherever the railway lines pass through new or growing villages and the local train service improved. It is indeed instructive to compare at this moment the facilities for getting to and from Doncaster enjoyed by two typical villages—Barnby Dun and Rossington. The former has a service each way of fifteen motor buses to nine trains and the latter no fewer than twenty motor buses to eight trains.



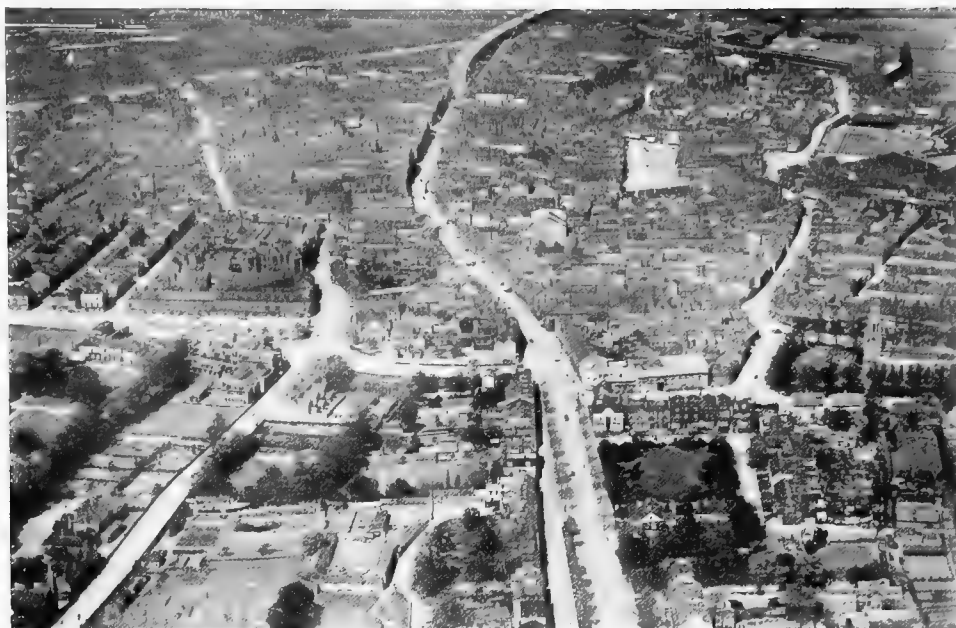
(E).—*FREIGHT TRANSPORTATION WITHIN
THE REGION*

FROM the foregoing sections it will be apparent that this Region is already well furnished with the means of transporting goods by road, rail and water. The two former are already on a scale to cope with great industrial development, provided certain safeguards are taken and obvious defects removed. Water transport, however, requires strengthening, and this should be undertaken either jointly with Sheffield, which is equally interested in the matter, or independently for this Region alone.

There should be no suggestion that these three methods of transport of goods are antagonistic. The old attempts on the part of one method to gain controlling interests in, and then sterilise the activities of another method, belong to the bad old school of economics. The better facilities that are offered for freight transport, the more rapidly will the district grow, and the more goods there will be to carry. A healthy emulation in efficiency between the three methods, and the opportunity to use whichever one happens to suit the special type of goods, speed of delivery or destination, is what is required of this vital piece of industrial machinery.

PART IV

*DONCASTER: The EFFECT UPON IT of the GENERAL
PROPOSALS of this REPORT*



A roplane view of High Street.



Entrance to the Town from the south by the Great North Road.
DONCASTER

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As the metropolis of this Region—its market, shopping, and recreational centre—it is necessary to forecast, so far as is possible, the future of Doncaster. Will its present dominating position be maintained, augmented, or diminished?

It would of course have been possible to suggest that the most economical plan for the Region comprised in this Report would be to concentrate the *whole* of the new residential development in Doncaster, and to provide a series of swift radiating routes in every direction to collieries and factories wherever situated throughout the district. Doncaster, with its ring of suburbs—all satisfactorily planned—would have absorbed the whole housing growth, and the scattered villages would merely shelter caretakers and the few hands who had to be always on the spot. A single large pillar of coal would be left under this huge town, whose superficial extent would be far greater than that of any existing town (of similar size) owing to the looseness of its suburban density, dictated by modern standards of twelve houses per acre.

A careful study of the zoning recommendations in Part II., however, will show that this is not the view of this Regional development scheme: it is intended to surround Doncaster with a ring of satellite towns or urban communities, taking for the most part existing villages¹ for their nuclei, but in several places establishing new centres.² This method of growth, provided the small communities are accessible to each other and to Doncaster, should prove far more healthy and pleasant than a single gigantic town: provided, also, that the small communities are not formless *amœbæ*, but vertebrate in structure, containing their local centres and *foyers* of social life.

But it must not be thought that Doncaster itself will suffer in consequence. She will, on the contrary, react to every increase in the surrounding communities: an exchange bearing a similar relation to them that the Manchester Exchange does to the surrounding county boroughs will probably come into existence: her shops will become great central stores and emporiums; in a word, she will become the financial heart of the Region.

In actual size her growth will be considerable: at present containing about 54,000 persons, a population at least twice that number must be anticipated. It is not intended to attempt a plan for Doncaster of the future—this is being prepared at the moment by Doncaster itself—but merely to forecast some of its future problems, based upon a close study of its surrounding Region.

As already remarked, it is not indeed the intention of this Report to trespass upon the prerogative of any Authority comprised in the Region to prepare its own detailed plan of development. But it is the function of a Regional scheme to indicate

¹ See under separate 'Villages,' Part VI.

² See Part VII.

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the probable extent of the growth of the communities and to suggest the degree of boldness required in their proposals. The difference, for example, between the scheme necessary for a town which is likely to remain stationary or to grow gradually, and that for a town which in a few years is destined to change from a country market town into a modern metropolis, is radical.

Doncaster has the makings of a fine city of the first magnitude : the approach to its main street—at any rate from the south-east along the Great North Road—is perhaps as fine as the entrance to any town, great or small, in the United Kingdom. The ownership of a great corporate estate, both in the town and around it, gives it opportunities for carrying out projects and reaping the financial benefits of prosperity rare in this country. Its architectural character, not only in the Parish Church and famous Mansion House, but in many dignified houses dating from the eighteenth century, has nothing provincial about it ; though, as already remarked, one deplors the destruction of many fine old buildings which would have added historic interest to its streets. Its road plan, again, is no muddle, like that of many larger towns, but, thanks to a level site and a Roman origin, is simple and easily grasped : and, one might add, easily capable of expansion.

ROAD PLAN

The diagram of radial roads converging on Doncaster shows clearly the need for relieving the four main cross-roads at an early date. Internal bye-passes, at least as wide and direct as these roads, must be provided : whether these internal bye-passes would be linked up to form an inner ring or two half rings is not to be determined here.

CIVIC CENTRE

The Mansion House is admirably placed in the centre of High Street as the Mayor's residence, and perhaps at present the Council Chamber : but unless it were possible to purchase the whole depth of the plot back to Printing Office Street there would not be room for adequate municipal offices here, and a real civic centre would be impossible.

A site should be laid out as soon as possible for new municipal offices and other public buildings : Cardiff is an example where this has been done in a quickly growing modern town. As each subsequent building is added, increased dignity is lent to the group—in contradistinction to the common practice of buying up isolated sites and dotting public buildings here and there.

The separation of the Mansion House from this group, though on some grounds regrettable, is not vital : the so-called Town Hall at Liverpool, for example, is some considerable distance away from the Municipal, Education, and Tramway Offices, and is entirely used by the Lord Mayor as his Town House and for the Council Chamber.

In preparing a scheme for a Civic Centre it is not sufficient to have a well-balanced site plan : control of the architectural character and heights of the buildings is also necessary to obtain the full benefits of combined grouping.

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STATION APPROACH

Doncaster is fortunate in having its seven main lines combined into a single Railway Station. It is to be hoped that at some time a worthy façade should be given to it, so that it may appear as the great modern portal of the city. The space in front is large but shapeless, and there should be a straighter connection with the main streets of the town.

SHOPPING STREETS

Without doubt more streets should be designed to become shopping streets, for which purpose continuity of shops with existing shopping streets is desirable.

ZONING

Just as the Region is zoned in large tracts, so is it desirable to lay down a zoning scheme for the city of Doncaster, in order that factories and houses may not be jumbled together and that business areas may be encouraged where appropriate. The extent to which these three types of area should be segregated or combined requires careful study and definition.

PARK SYSTEM

Open spaces should be provided on a systematic basis, from the small children's playground, at frequent intervals, to the large local parks, so that every part of the town may be adequately served. Access to these should, so far as possible, partake of the nature of tree-planted avenues or parkways in contrast to hot or arid streets and dusty motor routes.

PART V

*The WEST DON VALLEY DEVELOPMENT:
MEXBORO', CONISBROUGH, and DENABY*

WEST DON VALLEY

At the point where the Don, after leaving Rotherham, takes a sudden turn to the east and enters this region, is to be found the town of Mexboro', one of the oldest industrial centres of the Don Valley. To the west lies Swinton (outside this Regional Scheme) amid a maze of railways: a most important junction. Stretching north-west from here towards Barnsley is the famous Dearne Valley, continuously industrialised and decidedly one of England's least attractive spots. In many ways, therefore, Mexboro' might be considered to have more affinity with the Barnsley region, having the conditions of the older industrialism, rather than the newly developing possibilities of Doncaster. Indeed, it is an object lesson of the necessity for the preparation of planning schemes which should provide against the repetition of the errors of a past generation: the old part of the town, for example, abuts on the banks of the River Don (the Sheffield and South Yorkshire Navigation) and takes up a large area of land which is admirably suited for industrial purposes and works, the close proximity of the river and railway making this obvious.

The roads themselves in the immediate vicinity are narrow, as are the old connections between villages which have been allowed to be built up without being widened. The traffic, however, is large, Mexboro' being a market and shopping town for a large area, and, although they are hardly of sufficient width for pedestrian traffic, these roads carry tramways and buses, and a state of dangerous congestion prevails.

The housing conditions here are also worse than anywhere else in this region: the village of Denaby Main is an example of what is to be avoided for the homes of industrial workers. Nowhere else is the population of the Doncaster region so dense as in this West Don Area.

It must not be thought that these remarks cast any reflection upon the present inhabitants or Councils of this portion of the Region: the conditions are merely those found throughout industrial England where immediate trade prosperity was the only aim. But a warning is here held out to the new industrial area with which this Report largely deals.

Very careful consideration and much time has been spent in studying how best to remedy these mistakes of the past round Mexboro'. Firstly, the higher ground above the town should be developed for housing purposes, for which it is admirably suited. Then the whole of the Don Valley between Mexboro' and Conisbrough should be reserved for works.

A small area adjoining Mexboro' on the Melton side and also near the river between Conisbrough and Doncaster is subject to flood. The presence close by of large pit heaps could be used to lift the level of this land which would create additional works sites. Unlimited power is available from both collieries, which,

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coupled with the advantages of the river and railway, provide the requisite conditions for future engineering or any manufacturing purposes. This district is well served with railways, tram and bus service, giving easy, rapid and cheap means of transport for the industrial population, which would find employment in any new industrial undertakings.

Besides the two coal pits—the Denaby and the Cadeby—Mexboro' has been the seat for many years of the Glass Bottle Industry. This trade, as is well known, is subject to great vicissitudes, and in the past has had many ups and downs. It is felt that every effort should be used to help the district to obtain additional and varied industries. At one time an excellent boat-building trade was carried on here and, while this industry appears to have entirely disappeared, it is possible that with the revival of trade and the establishment of Works, demanding, as they will, the lowest possible transport charges, water carriage may again become an economic feature and boat-building be again revived.

Between Mexboro' and Doncaster the valley of the river is flanked on either side by cliffs of magnificent limestone, where the Permian bed outcrops; these are only worked in parts. It is impossible to believe that so very valuable a bed of limestone situated in close proximity to the industrial towns of Yorkshire and Lancashire can remain much longer with so little working of the stone taking place.

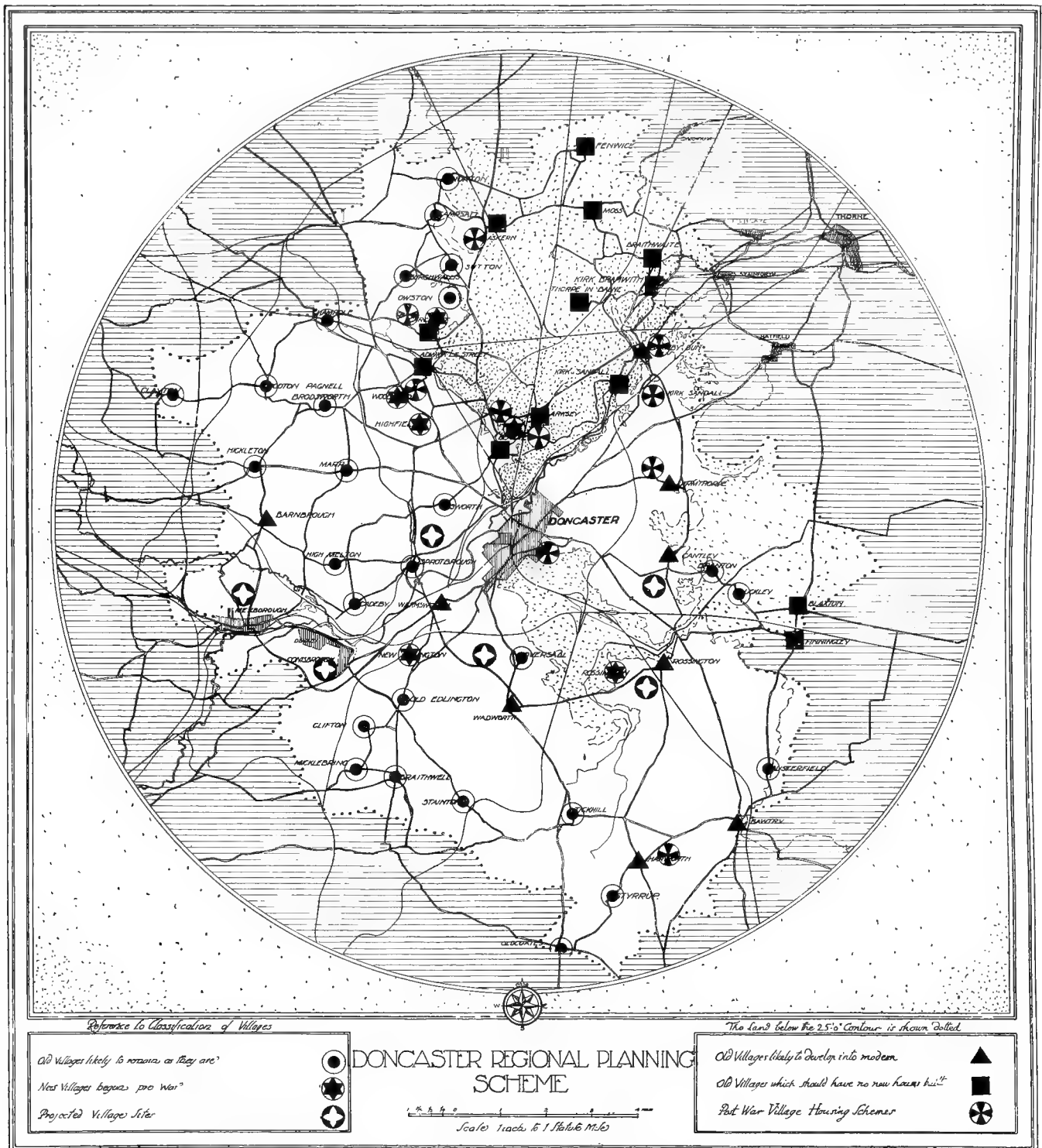
In addition to the presence of limestone in almost unlimited quantities there are many other valuable mineral substances present in the cliffs, the importance of which appears to have been almost overlooked, and large fields of mineral wealth are practically lying dormant and hardly known here. After the river reaches Sprotbro' the cliffs close in very much, and are precipitous, and the valley becomes very narrow, practically little wider than the width of the two channels which run parallel to each other at this point. The country changes; the scenery, though on a small scale, becomes some of the very best to be found in this part of England. It is felt that this portion of the valley and the adjoining land should be protected against the possibility of its ever being damaged or spoilt in any way.

Midway between these two extremes—the grime of Mexboro' and the loveliness of Sprotbro'—lies Conisbrough, the newly formed U.D., which appears to partake of something of the nature of each. Its Castle and the immediate surroundings are a romantic spot of great beauty which should be preserved, as indeed it is to-day, with the greatest care.

Exactly where industry should end and the reserved valley commence is difficult to say without minute study; but the sharp bends of the river should give the opportunity for a definite break. Again this Report does not seek to trespass upon these detailed considerations, but to point out how needful it is to combine detailed requirements with general principles.

PART VI

*NOTES upon EXISTING VILLAGES in the REGION.
THEIR PRESENT CONDITION: SUGGESTED
IMPROVEMENTS: FUTURE GROWTH*



Classification of the Villages of the Region.

THE VILLAGES

1. *Adwick-le-Street*.—An old farming village until the coming of the collieries, which have entirely changed its character ; it is now the railway centre for a large colliery district. Since the formation of the U.D. of Adwick-le-Street, which embraces the adjoining village of Carcroft, the district has made rapid strides owing to the presence of two of the most successful collieries in the Doncaster area (Brodsworth and Bullcroft Pits).

Both of the old villages Adwick-le-Street and Carcroft are on low ground, and it is not advisable for them to grow in this direction. In both these places the land adjoining the railways could, however, with advantage be used for works, high tension power lines being available ; it is suggested to restrict the low-lying lands for industrial uses.

The Council Housing Site here is situated on the land lying between the Brodsworth Model Village (Woodlands) and Adwick-le-Street ; it forms a compact, well-considered scheme of 278 houses, and acts as a connecting link between the old and new portions on the west of the U.D. There is plenty of high land available for future residential growth.

2. *Adwick-on-Deerne*.—A pleasant village, lying on the extreme north-west edge of the Regional Area, which does not appear likely to change its present rural character.

The roads all round the village have acute corners, which should have attention as soon as circumstances permit.

3. *Arksey*.—This village lies on the low ground, just between the area we have indicated as suitable for manufacture and the farming belt.

Indications of settlements with fracture of the surface show themselves on the north-east end of the village.

No new houses should be allowed in this village.

4. *Armthorpe*.—Situated about three miles from Doncaster, and on rising ground. Until recently a small rural village, with the advent of the new colliery and the housing developments in connection with the same, its character has entirely changed and is changing. The original straggling village street of a mile in length is bound to develop as an offshoot of the colliery village, which lies at the opposite end nearer Doncaster. The village will form the terminus of a very important short radial road

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from Doncaster (see page 43). Considerable improvement¹ is required to the road corner where this radial road enters the proposed Ring Road, which touches the old village at the extreme east end and will form the means of access to Armthorpe for traffic to and from the Great North Road, and also for traffic proceeding from Armthorpe to Thorne and the East. A considerable future is predicted for this village. A Centre should be provided situated in the vicinity of the Church, which would form a means of connecting the old village with the new.

The new village erected on some of the highest ground available is designed on sound lines, and is sufficiently far away from the colliery to avoid the smoke from the pithead. Full advantage has been taken of the wooded surroundings of the new village site.

5. *Askern*.—Originally a Spa noted for its mineral waters and baths, has in recent years entirely changed in character. A new colliery has been sunk on the top of the hill on the Campsall side. A large colliery village has been erected on the west side of Askern, and is being enlarged. The old town of Askern stands at the foot of the hill on very low ground, a large portion of which is waterlogged, the subsoil being of a boggy nature with a bed of peat. It is exceedingly undesirable that any building, other than in connection with agriculture, should be permitted in the direction of Moss Road, and all building operations should be confined to the high ground, towards the west, which rises swiftly to about 70 feet above Ordnance datum.

The plan of the new village is too much of the gridiron type, and might with advantage be somewhat revised in future extensions.

The Trunk Road No. 2 (Doncaster to Selby) passes through the village, forming its principal street: this should be widened as soon as is practicable, for a bye-pass is impossible, the high ground closing it in on one side and the railway and pools of water on the other.

6. *Austerfield*.—Of historical interest owing to the fact that it was the home of the Pilgrim Fathers; a large number of American visitors congregate at the church here at different times.

It comprises one long village street built up to the road, which is of moderate width. This requires to be widened, as it forms part of the road to Thorne.

The presence of a large bed of gravel and sand here, together with the new Silica Brick Works, indicates that a certain amount of additional commercial prosperity has recently come into the village.

The Haxey, Bawtry and Tickhill Light Railway passes under the village street at the northern end.

7. *Awkley*.—An old village very scattered and straggling; it is on the road from Doncaster to Finningley. There are several sharp turns in the village street which require widening sufficiently for village purposes and to avoid danger. The bridge over the River Torne should be widened and made much safer than at present. The

¹ See Plate IX. Nos. 9 and 10.



The point at which the Ring Road turns to the right past the White Hart Hotel.



Where the new Bridge for the Ring Road will be placed.

BARNBY DUN

suggested road improvement mentioned elsewhere will relieve Awkley of a large amount of the traffic now passing through it.

8. *Barnby-on-Dun*.—This important village, though on the banks of the Don, is fortunately situated upon a sort of promontory of land above the 25 feet contour. It is almost certain to grow in size, and can do so on the north-east, but only to a limited extent.

A new housing scheme of sixty houses is in course of erection on this north-east side.

The Ring Road crosses the Don and Canal at this point,¹ and for a short distance coincides with Radial C to Doncaster.

Owing to the fact that the main street of the village is an exceedingly narrow one, the road adjoining the housing scheme is designed to take the joint radial and ring traffic.

The Ring Road across the Don runs through the proposed factory area over the river and, if this develops, Barnby-on-Dun will grow rapidly.

9. *Barnborough*.—A pretty village standing on high ground; its church has a beautiful old tower, forming a landmark for many miles round.

The approach by road from Doncaster is bad, and provision has been made for remedying the same.

The new Barnborough Colliery is within a short distance, and, when fully developed, is bound to have an effect on the village.

The Barnborough Colliery Company's Housing Scheme might have been with advantage placed on higher ground, somewhat to the East, which would have linked up the old and new villages, thus forming a community of interests rather than two isolated villages, each with its own centre.

10. *Bawtry*.—An old market town on the Great North Road, nine miles south of Doncaster, which has a wide village street forming the market-place. It is the point where several of the main roads converge, including the main road into Lincolnshire by Gainsboro' Bridge, the nearest bridge over the River Trent. The two streets giving access to the Gainsboro' and Lincoln Road are narrow, with right-angle turns and very bad corners of an exceedingly dangerous character. It is suggested to construct a short length of new road, utilising an existing garden for this purpose, this would form a wide straight approach. The work is of an urgent character and should be carried out as soon as possible. This road passes out of the Doncaster Regional Area almost at once.

The mining developments at Harworth are bound to reflect on Bawtry, as this is the nearest point for shopping and railway facilities. The road from Bawtry to Sheffield and Tickhill, which forms an arterial road approach to the Great North Road, requires widening from where it begins to narrow to Bawtry market-place. The development of Harworth and the presence of the Great North Road, bringing as it

¹ See Plate IX. No. 5.

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now does a large amount of motor traffic, together with the fact that it contains good hostelry accommodation is bound to make this charming roadside town a prosperous place in the future.

11. *Branton*.—An exceedingly small village abutting on the road from Doncaster to Finningley, situate about four and three-quarter miles from Doncaster. The village street is very narrow, and contains some dangerous corners, particularly the one near the public-house, the scene of many accidents. It is essential that this corner should be eliminated, and when opportunity occurs the widening of the village street should have consideration.

The suggested road improvement mentioned elsewhere¹ will relieve Branton of a large amount of the traffic now passing through this village.

12. *Bentley*.—Near Doncaster, situated on the Doncaster to Selby Road (No. 2), has entirely changed its character within the last ten years; from an old agricultural village, having a very small population, it has grown into a large mining centre, with a population of 13,000, and was in 1911 formed into an Urban District. Bentley Road, its approach, is no longer a country road, but carries tram lines; the traffic is altogether too much for it and an alternative road is suggested to provide for this traffic from Doncaster and London to Selby and York, etc.

The greater portion of Bentley is located on low-lying land unsuitable for housing.

The Bentley Colliery, a short distance off the main road, has the distinction of being the first colliery to be sunk in the New South Yorkshire Coal Area.

The High Street of Bentley should be widened, also Cook Street, from which the suggested relief road, by Watch House Lane, joins the Great North Road, near the Sun Inn.

13. *Blaxton*.—A very small place, practically a hamlet, situated close to the junction of the road to Haxey and the road to Hatfield, Woodhouse, and Thorne. Widening is required to the road at this point. Again, it is undesirable that this village should grow other than for agricultural purposes.

14. *Braithwell*. See *Edlington*.

15. *Braithwaite*. See *Kirk Bramwith*.

16. *Brodsworth*.—This is the old village, which, instead of being changed into a new one as a result of colliery development, has been left in its original state, with the addition of a few new houses. Not being situated on a road of any great importance, it may be expected to grow gradually, reflecting indirectly the prosperity of the Brodsworth Pit. See *Woodlands*.

¹ See page 42.

17. *Bilham*.—A small hamlet some little distance off any main road ; is quite rural, and seems never likely to change its present character.

18. *Burghwallis*.—An old rural village (which should be preserved) surrounded by a charming piece of country never likely to be interfered with by any industrial developments.

As the village stands on a short length of radial road, the existing road corners are being dealt with to provide an easier and safer road through.

19. *Carcroft and Skellow*.—The new villages of these names form the northern portion of the U.D. of Adwick. The old village of Carcroft being on the low-lying land, it is not desirable that housing should be developed here or on the east towards the Doncaster and York Road ; it should be confined to the higher ground on the north and west. The new village of Carcroft and the Council's housing scheme at Skellow, the latter on high ground, are good examples of modern ideas well carried out.

The old village of Carcroft forms the centre for shops and amusements of this part of the area, and will continue to do so.

20. *Campsall*.—Standing on high ground and forming a little picturesque village, with a fine parish church. Every endeavour should be made to retain the existing rural character. Owing to the fact that a short arterial road from Askern to Barnsdale Bar, Skellow and Carcroft passes through Campsall, it is found necessary to by-pass the village street.

It is not contemplated that this village will grow very much in size ; it might, however, in course of time be used somewhat as a suburb of Askern, but this would probably only be for a limited number of larger houses.

21. *Cadeby*.—A small picturesque rural village near Sprotbrough ; it stands off any main or radial roads, and is not ever likely to change its present agricultural character, and should be preserved as far as possible in its present state.

22. *Cantley*.—A small picturesque village, situated just over three miles from Doncaster, which will abut on the proposed Ring Road. Owing to its proximity to Armthorpe, where a new colliery has been sunk and a new village built, it is sure to share in the new prosperity. The Ring Road where it passes through Cantley is carried by a by-pass which removes the traffic from the dangerous corners and out of the village street.¹

An important community centre should be planned somewhere in the neighbourhood of this village.

23. *Clifton*.—A picturesque agricultural village standing on high ground, with an old manor-house and church ; the surrounding country and Clifton Beacon making an exceedingly pretty background.

¹ See Plate IX. No. 11.

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This village is never likely to be affected by industrial developments or to change its present rural character.

24. *Cusworth*.—A very small pretty village clustered together on the hillside ; it is about two miles from Doncaster, standing on the high ground overlooking the Don Valley. The beautiful park, with a mansion overlooking the lake, occupies a commanding position and can be seen from Doncaster and many miles round. There is little, if any, likelihood of a pit-shaft ever being sunk between Doncaster and Brodsworth, and, although perhaps somewhat with regret at the idea of so handsome a demesne with its beautiful park and woodlands being ever disturbed, this appears to be the natural direction which the future growth, of a residential type, of Doncaster must inevitably take.

25. *Clayton*.—An old agricultural village situate on high ground between Frickley and Hickleton Collieries, but sufficiently distant from either to ever be affected by colliery development.

26. *Old Edlington, Stainton, Braithwell and Micklebring*.—These four are all of similar character, typical agricultural villages of the district ; they are likely to remain so but may react to some extent to the sinking of the Maltby and Edlington and other collieries in the area.

Various minor improvements are suggested in these villages. At Braithwell two very bad corners exist, and it is proposed to construct a short bye-pass road here to remove the danger, which is of a serious character.

27. *New Edlington*.—This village, situated on the main road from Doncaster to Sheffield, and constructed much too near the shaft of the Yorkshire Main Pit, was erected about ten years ago, and leaves nearly everything to be desired in its planning and the way the work has been carried out, reminding one of some of the early efforts at housing in the South Wales Coalfield. It is desirable that some steps should be taken to remedy this, and that future Housing should be on remodelled lines and farther away from the colliery on the higher ground towards the village of Old Edlington. The approach to the village is bad, particularly from the present Tram terminus ; a partial remedy might be made in a new approach from the Radial Road from Doncaster to Maltby, referred to previously.

The best course, although costly, would be eventually to form other entrances to the village from the Sheffield Main Road, from a point west of the present entrance.

28. *Fenwick*. See *Kirk Bramwith*.

29. *Finningley*.—An old agricultural village, grouped round an attractive village green, is just outside the Doncaster Regional Area ; it is situated on low land, the sub-soil of which is all gravel and sand. The saturation point, owing to its low level, is

very near the surface, and the whole of this district is suitable only for agricultural purposes. However, recently Engineering Works have been constructed near the railway station—a clear example of the way in which isolated works may spring up anywhere in the Doncaster Regional Area. It is undesirable that the Finningley district should develop to a large extent as a housing village as the people employed can be housed on the higher land near Cantley. The Road to Thorne is shown in a bye-pass in order to avoid the twisting street of the village.

30. *Hampole*.—A small hamlet about 7 miles from Doncaster on the main road to Leeds; it is purely agricultural, and is never likely to change its present character. An alteration to the road corners is proposed.

31. *Harworth*.—This small picturesque village, situated $2\frac{1}{2}$ miles from Bawtry, is entirely changing in character from an agricultural to a mining village as fast as mining engineers can do this.

A good wide grass lane, to be made into a paved road, on the site of an old road, connects Harworth to the small town of Bawtry, where the railway station and shopping facilities for this district are at the moment to be found. A better means of connecting Harworth to Bawtry by rail should be provided.

The new Harworth Colliery Village, which is being erected by the Harworth Colliery Company, will provide housing for the workmen employed at the Harworth Pit; provision is made in the lay-out of the new village for the shopping, social and amusement needs of the large community which it is anticipated will congregate there within the next three or four years.

Proposals are made for widening the existing road from Doncaster to Harworth and Blyth, as this road should form one of the principal arterial roads of the district (see page 44).

32. *Hickleton*.—An old village with ideal surroundings, standing on the main road from Manchester to Doncaster.

This old village is one of the very few remaining unaltered in the Regional Area, and seems never likely to change its present charming character.

33. *High Melton*.—A small pretty rural village on the Radial Road to Barnborough. There is, however, the possibility of the road becoming in time an important relief road, and provision for widening the same is proposed. No likelihood exists of the village ever being affected by industrial expansion, and, in a region about to be largely industrialised and thus inevitably to lose much of its old-world charm, it is desirable to preserve as many villages as possible of the type of High Melton.

34. *Hooton Pagnell*.—This is one of the most beautiful villages in the district. Fortunately it is not situated on a road that will be required for through traffic: it is far from the Ring Road, is not on a Doncaster Radial, and has no railway station.

Though not far from the Frickley Colliery, it is not likely to be used as a housing

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village for the workers, and it is hoped that it will remain as it is with its beautiful prospect to the west.

That delightful old Manor House (Hooton Pagnell Hall) standing on the high ground is a landmark for many miles, and, together with the well-proportioned Church Tower, forms a group of old buildings difficult to surpass in the county.

35. *Kirk Bramwith*.—A picturesque little village in a district which, owing to its lowness of level, is subject to very heavy flooding. It stands between the River Don and the junction of the Canal. No houses, except in connection with the agricultural pursuits, should be allowed here.

<i>Thorpe-in-Balne.</i>	}	The above applies to these villages, none of which are on the Main Roads.
<i>Fenwick.</i>		
<i>Moss.</i>		
<i>Braithwaite.</i>		

36. *Kirk Sandall*.—This village, situated upon the banks of the Don and Dun Navigation, is below the 25 feet contour and comes within the Factory Zone. Messrs. Pilkington's new Glass Works have been placed in its immediate vicinity.

It is therefore recommended that no new houses be erected in the old village.

A new site for the village has been provided and a new village, which will eventually supersede the old, is being erected above the 25 feet contour: it is situated south-east of the G.C. Railway and will eventually stretch from the Barnby Dun to Doncaster Road to Armthorpe Lane. It is therefore connected to Doncaster by Radial B, and with the rest of the district by the future Ring Road.

There is probably a big future before this new village, which is supplied with electric light and water from Messrs. Pilkington's works, and it will be seen from the plan included, that a large Village Centre is being provided, with sites for the church, village hall, cinema, etc.

This portion of the Doncaster Area, although intersected by two main lines, Doncaster to Hull and Doncaster to Grimsby, suffers badly from the want of a good local train service. The new villages at Stainforth and Kirk Sandall, which are grouped around the railway stations of Stainforth and Barnby Dun, would in themselves be sufficient to justify the railway company concerned in putting down an improved train service, and it is hoped that before long this will be done.

37. *Loversall*.—An old agricultural village about $3\frac{1}{2}$ miles from Doncaster, which stands on the Main Road from Doncaster to Nottingham.

Owing to the very bad corner in the Village Street, and the grade of the Hill at this point, a bye-pass road is proposed, and the Old Village Road should be widened at the present dangerous corner.

38. *Marr*.—A pretty village about four miles from Doncaster situated on the Barnsley Main Road, No. 7. The village is supported by prosperous agricultural



PLAN of New Village of which the Ring Road forms the base: the Village Centre is set back at the head of a wide Avenue; houses already built shown black.



The first houses built on the existing Brecks Lane.

KIRK SANDALL

One of the new communities already springing up along the Ring Road.

surroundings, and, although the coming of the coal pits has had a somewhat retarding influence, it is likely to always retain its present character.

Proposals are made for widening the road where necessary.

39. *Micklebring.* See *Edlington*.

40. *Moss.* See *Kirk Bramwith*.

41. *Norton*.—A very small village, lying about one and three-quarter miles to the north-west of the town of Askern. The present village is occupied entirely by an agricultural population. The buildings and cottages generally are of great age and in a very bad state of repair. Efforts should be made to remedy this as soon as possible.

A start was made towards housing on modern lines, and a new road has been made. This is, however, now lying derelict, the scheme for forty-six houses being one of those suspended by the Ministry during the recent restriction of housing schemes.

There is a level-crossing at the L. and Y. Station.

42. *Oldcoates*.—An old village adjoining the Main Road from Nottingham to Doncaster on one side and the Main Road from Sheffield to Bawtry on the other. At present the village is of a purely rural character. It is, however, quite likely that the colliery developments foreshadowed in the neighbourhood may, if carried out, entirely change its aspect.

43. *Owston*.—A picturesque hamlet surrounded by park lands, with the hall and church standing in the background. Its present charming rural character should be maintained.

44. *Rossington*.¹—The new colliery village is situated towards the verge of the 25 feet contour and might well have been on slightly higher ground. Its future growth should be to the east and south, and not to the north and west. Its access to Doncaster is by the Great North Road. It has a station on the Great Northern Railway main line. It is also situated on the Ring Road.

The future of the village is at present bound up with the colliery ; but if the neighbouring low land, Potteric Carr, developed as a manufacturing area there should be a great future before it.

Its present method of planning leaves much to be desired, but the circular lay-out, if carefully treated, will provide a village centre for a considerable population.

The existing train service is meagre, and should be augmented by a motor rail service. Already a motor bus service exists, but it is very necessary for the growth and needs of this new community that steps should be taken at once to improve the facilities for communication between Rossington and Doncaster.

45. *Skellow.* See *Carcroft*.

¹ For improvements to old village, see Plate X. No. 14.

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46. *Sprotbrough*.—A place of great historic interest, famous for its ancient church, containing many monuments dating back beyond the time of the Crusaders. The village, clustered on the hillside overlooking the River Don, has always been prosperous, and is one of the most charming to be found in England.

The Valley of the Don at Sprotbrough entirely loses its industrial character, and is widely known for its great beauty. The river here passes through limestone cliffs of great height, and a glorious view is obtained from either side of the river of a scene remarkable even in such a county as Yorkshire. Sprotbrough Hall, the seat of the Copley family for many generations, is situated on the cliff side, the gardens having the appearance of overhanging the river.

It is recommended that the greater part of the parish of Sprotbrough should receive special and adequate protection by reason of its beauty, and the village church should be considered as an ancient monument of national interest. The name of Sir Walter Scott is closely connected with Sprotbrough, from the fact that he resided in this village when writing 'Ivanhoe.'

A recommendation is also made to prohibit the building of any works within an adequate distance of Sprotbrough, and for the preservation of the district for ever.

47. *Stainton*.—See *Edlington*.

48. *Styrrup*.—A small agricultural village, lying about one and a quarter miles on the south-west side of Harworth. The village has always been a small prosperous place, and may slightly enlarge itself through its proximity to the new mining centre at Harworth, but is hardly likely ever to become much larger than at present.

49. *Sutton*.—A very small agricultural village never likely to develop beyond its present rural character. The outer Ring would by-pass it.

50. *Tickhill*.—An old market town, now shorn of its ancient importance, on the site of the old Great North Road (London to the North *via* Worksop). The main street contains an old coffee-house of great beauty, and in the centre of the market-place, at the intersection of the road to Bawtry, stands the fine Market Cross. Tickhill Castle (largely demolished, the part left being now used as a house) stands at the south end of the village.

The High Street of the town forms the main road from Doncaster to Worksop, and, although of wide proportions, there are corners to be opened out; and a wider road is suggested on the site of the already existing back street. This road would act as a by-pass for the through traffic, which is considerable, and would do away with a very dangerous turn in the main road.

The town is largely agricultural and residential, and there appears to be little probability of its changing its present character. The fact of its being so badly served by railways has caused the town to decay since the days of the mail coach, when it had an era of greater prosperity than it is ever likely to have again.



Church and Village.



Lock on the River Don.
SPROTBOUGH

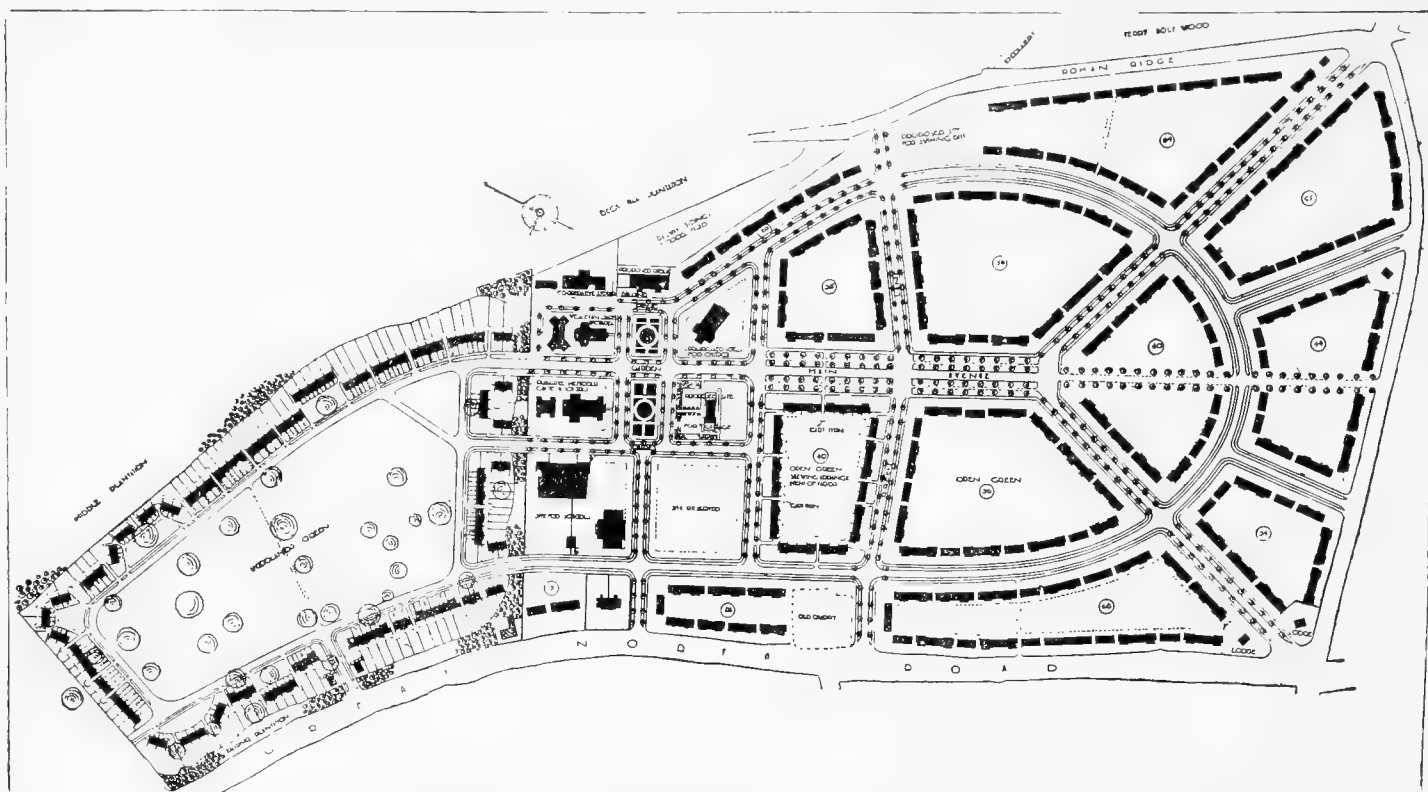


The Market Place, Cross and Village Pump.



The Doncaster Road leading to Worksop Old Road.

TICKHILL.



PLAN of the village of Woodlands situated on the west side of the Great North Road, on the site of a Park.



Houses facing the Green.

WOODLANDS

The first community in the district to be laid out on modern lines.

The parish church of Tickhill has a most beautiful tower, which forms a landmark for many miles round.

51. *Thorpe-in-Balne*.—See *Kirk Bramwith*.

52. *Wadworth*.—Situated on the brow of a steep hill on Road No. 4, the village is visible for many miles round. Its character is purely agricultural, but may very probably change owing to its proximity to Rossington, and the possibility of a shaft being sunk somewhere in this district. A short length of new road forming part of the Ring Road also serves as a bye-pass for the village. The New Route from Mexboro' to the South intersects the Ring Road, and also Road No. 4, here.

53. *Warmsworth*.—A small pleasant village lying on the main road from Sheffield to Doncaster (No. 8) near its intersection by the Ring Road. It is rapidly changing its character owing to the Edlington Colliery Village practically joining up to it. A dangerous bend in the road at the entrance to the village from Doncaster requires immediate attention.¹

Warmsworth has the distinction of having its Church Belfry situated in the village, about one mile from the Church.

54. *Woodlands*.—This is one of the new villages of the district—entirely planned on a new site to meet the changed character of occupation produced by the Brodsworth Colliery. It is situated nearly a mile to the east of the old village of Brodsworth (*q.v.*).

The site chosen for the village was Woodlands Park—a beautiful stretch of park land lying along the Great North Road. A large green, on which are growing magnificent forest trees, has been preserved, and the houses grouped round it: in this part of the village, it is to be noted, the houses do not face on to the Great North Road, but an existing plantation has been preserved as a screen. A Village Centre has been laid out on admirable lines, and, generally speaking, this may be looked upon, as regards site-planning, as a model of what the new communities should be like. Begun in 1907, the whole scheme was prepared at top speed, as houses were immediately required for the onrush of labour to work in the pit. Great credit is due to the designer, Mr. Percy Houfton of Chesterfield, for this, the first of the new communities to be planned on sound lines.

A later portion of the village, farther south, is a melancholy example of falling off in standard.

¹ The road originally passed straight through the village, in front of the Hall.

PART VII

*The DEVELOPMENT of NEW RESIDENTIAL CENTRES
AND THEIR RELATION TO DONCASTER*



The red patches are the residential areas of Doncaster and the surrounding communities, containing a population of 400,000 at the rate of 50 per acre; the green open spaces are at the rate of 250 persons per acre. The roads are white, the railways yellow. Low-lying land, prohibited for housing, is coloured purple (factories), and buff (agriculture).

NEW RESIDENTIAL CENTRES

By new residential centres are meant both those growing places already in existence, such as Adwick-le-Street and Bentley (absorbing old villages), and Woodlands and Kirk Sandall (colonising new sites), also those entirely new communities which may come into existence as a result of this Regional Scheme.

It is desirable to make it clear that all of these types of new communities are not to be treated as isolated suburbs of Doncaster: fragments, as it were, of her suburban growth that have got separated from the parent mass, as moons have been formed from a planet. On the contrary, they are complete entities whose existence is in no sense the result of an overflow from Doncaster but is owing to one or other of the fundamental causes of urban birth.

They should therefore be equipped with the organic formation needful for full corporate growth. While each community forms part of the Doncaster Industrial Region, in other words is a member of a well-regulated family, each individual possesses full functional powers.

It is necessary to dwell upon this at some length in order that, when the local schemes of these communities are being prepared, no feature of a fully organised modern town may be omitted. Factory areas and main roads are determined regionally; but locally there will be the provision of a visible centre of community life, a shopping centre (which may be coincident with the former), open spaces, in the form of children's playgrounds, playing-fields and local parks, allotment gardens and additional space for those who wish to keep poultry and pigs, etc.

The size of house plot or general density of houses in residential quarters per acre, and the number of persons per gross acre of the whole area of the developed community, require determining. There is no reason why each community should not be based on what is commonly called the Garden City Standard—using the term in this case in its true sense and not as a misnomer for the Garden Suburb. With any amount of land available, the maximum density of twelve houses per acre of residential quarters should not be exceeded. There is no reason why the houses should not be grouped considerably closer together, for economy of estate development, provided the average is preserved. It will be noted that in many of the old villages and towns of the district the houses are continuous on to the street front, but possess deep garden plots behind. Something of this sort might be attempted, as a departure from the practice of the recent Government Housing Scheme, in order to economise in road construction and the length per house of sewer, water, gas mains, etc. But this suggestion does not for one moment countenance the lowering of the general standard to an average of twenty or twenty-five houses per acre.

The average number of persons per acre of the whole community, including all

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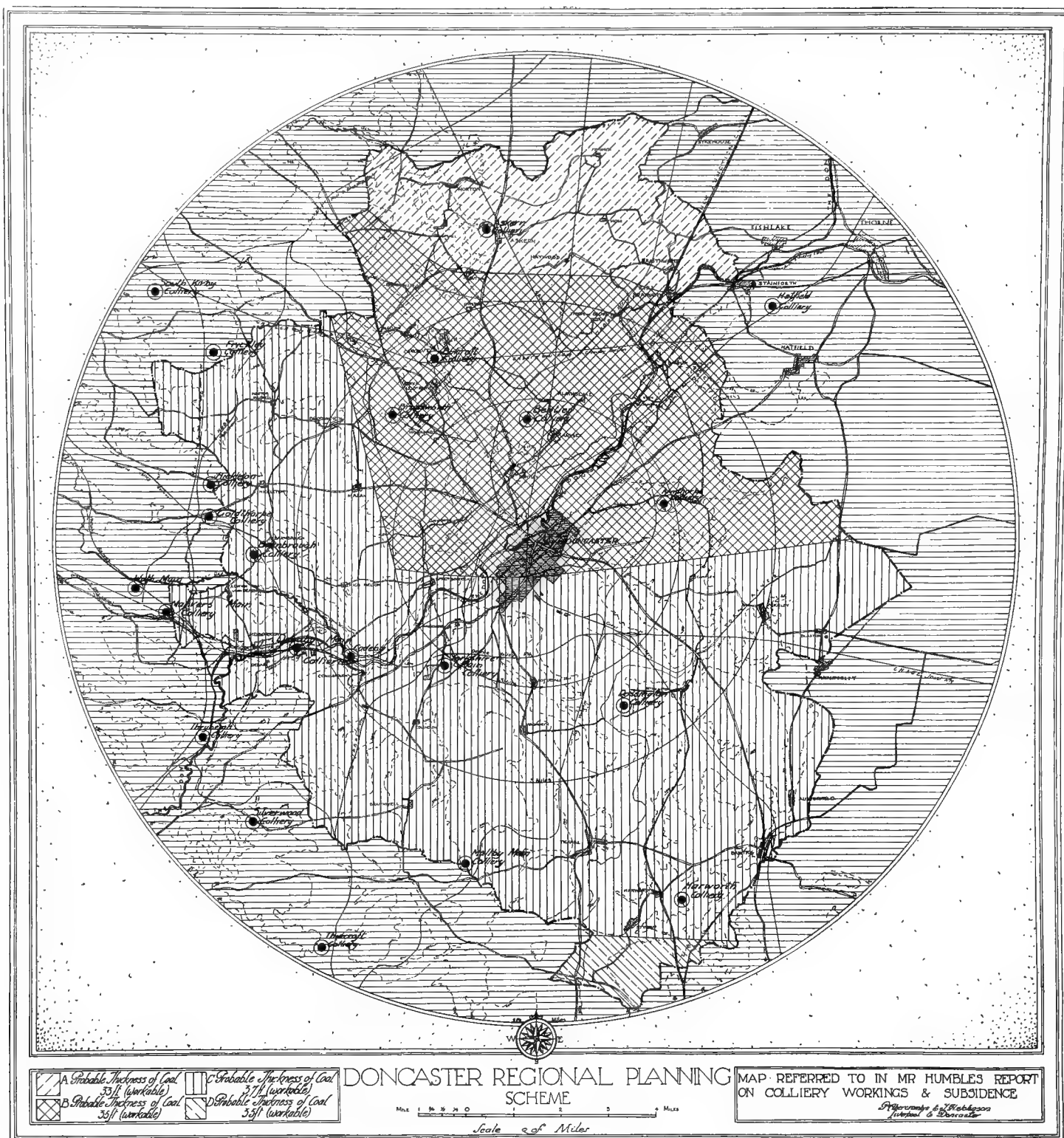
local open spaces, civic centres, shops, allotments, etc. (but excluding agricultural land and the low-lying factory zones), should not exceed fifty.

There is one other exceedingly important consideration which a mention of Garden City principles at once raises: whether these new communities should be of limited size. There are very great advantages in this, and it appears that 15,000 to 20,000 would be an adequate size to obtain the benefits of communal existence on a local scale, while the total population of the region would permit Doncaster to afford first-rate theatres, a concert hall, and the other self-supporting amenities of a great city. The provision of the essential free cultural institutions would be more difficult to arrange, unless some Regional rating scheme were established; for indeed it would be manifestly folly for each of these small communities to run a peddling Art Gallery, Museum, or even a complete Library. Obviously one really big Institution of each sort should be located at Doncaster, and, where necessary, branches in the surrounding communities. It is needful to labour this point because unquestionably the drawback to the small isolated town (so admirable in many respects) is the narrow scope it offers to the study and enjoyment of the higher branches of art and science. The great city has these compensations: Liverpool, Birmingham, and Manchester, for example, can just produce a Repertory as distinct from ordinary Theatres: Leeds, again, is large enough to support a season of Grand Opera. Orchestral Concerts, in the same way, and important Picture Exhibitions are practically limited to the few large towns.

It is contended that, on the system of growth and urbanisation advocated for this Region, the advantages of the small towns will be obtained with their proximity to the country and farm produce, their low density of houses and their closeness to places of work; at the same time the whole Region will have the advantage of being a great *foyer* of civilised life, with all that this implies.

It may sound an impossible thing to limit the size of growing communities: in one way, by adopting a limited density per acre and refusing to allow the extension of boundaries of urban districts, the nominal population can be restricted. But not the actual, as growth will overflow beyond the artificial boundary line. This matter has received very careful consideration; and, attractive as it would be to parcel out the limits of urban areas, showing green separating strips, it is difficult to do this until some further indications are given of the early points of development of the large factory areas. At the same time a visionary plan is submitted—to show what would be the ideal lines of growth for the region. And it might be added that if due encouragement by means of road and railway facilities, etc., were given to Doncaster and its surrounding communities to grow where and in the manner indicated in this Report, this ideal has every prospect of being realised by natural means. It has also already been pointed out (Part II., B) that the skilful preparation and administration of local town-planning schemes can do much to guide the new growth in the right direction, provided they are always related to a Regional ideal.

APPENDIX on COAL SUBSIDENCE



APPENDIX on COAL SUBSIDENCE

HALLGATE CHAMBERS, DONCASTER,
19th January 1921.

To

THE JOINT TOWN-PLANNING COMMITTEE FOR THE DONCASTER REGION

GENTLEMEN :—Agreeable to a request from Mr. Reginald Jones, and confirmed by Mr. Francis Alvey Darwin, I now have pleasure in briefly reporting to you my views on Subsidence, due to the sinking of Coal-pits, and to the working of Coal Seams in the area under review, as affecting the important question of Town Planning.

If I do not make my views clear, I will be pleased to give any further information so far as my technical knowledge is concerned, extending continuously over a period of forty years, and obtained principally in Derbyshire, Nottinghamshire, Warwickshire and Yorkshire, including professional visits to other coalfields in the United Kingdom, also on the continent of Europe.

WHAT IS SUBSIDENCE AND ITS CAUSES?

Subsidence is the lowering of the surface, due to several causes which I will summarise, and is a serious matter when the Ordnance Datum approximates sea level, owing to the damage it may cause to Agricultural pursuits, to property, and the ill effect it may have on Sanitary and Drainage arrangements, which, if neglected, will jeopardise the health of the community living in the vicinity.

The cause of subsidence may be explained in several ways. First and foremost, the surface naturally goes down if you take away its intervening support such as a coal measure, and ironstone measure, or any other mineral substance, without replacing it with a support equal to the one taken away.

Secondly, if water in large volumes is pumped, whilst sinking through a running sand measure, peat bog, or crushed limestone, or any other porous strata of a like nature, subsidence will follow. If freezing or cementing the sides of the shafts is resorted to, this danger is eliminated to a great extent.

Thirdly, you may leave a pillar, but if the coal is worked around it, and a running sand, or a like measure, such as peat bog or crushed limestone, is over the pillar, you get subsidence around the pillar, and subsidence of the land on the pillar as the water runs out of the land, peat, or crushed limestone into a lagoon made round the pillar, due to subsidence when the coal had been extracted.

Fourthly, assuming the pillar left is not large enough, or the same is intersected by fissures or breaks, as the faces work up to the same, the pull of the goaf area will cause subsidence over the whole or a portion of the pillar area, dependent on the position of the fissures and the angle to the working face.

Fifthly, assuming a pillar is fired by spontaneous combustion, and is allowed to burn itself out, due to air leakage, subsidence will follow.

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Sixthly, subsidence often takes place when water is tapped from old workings drowned out previously, owing to the water before being drawn off acting as a support.

Seventhly, a pillar left as a support is sometimes affected by an earth movement, which may or may not cause subsidence, owing to the disintegration of the same.

The area under review is 100,000 acres or thereabouts, and as this large area, in the writer's opinion, is only in its infancy as regards miscellaneous developments, the importance of looking ahead is most essential if the health of the people, in what will be a thickly populated area, is to have the care shown to it such an important matter deserves.

THE GEOLOGICAL FORMATION

To the west of a line drawn north and south of Doncaster, you have in most instances the two Limestones covering the surface of the Carboniferous measures, to the east the Red Sandstone is found covering the two Limestones. Between the sandstone and the limestone you frequently meet with Marl, also occasionally 'running' sand.

AREA UNDER REVIEW DIVIDED INTO SECTIONS OR PANELS

I wish to make the following observations *re* the total area as divided on the plan submitted with the report.

(a) The area in the extreme north of the area under review is undoubtedly the zone in which the marked change takes place between the South and West Yorkshire Coalfields, and I estimate the thickness of the seams to be mined in this area at 33 feet (workable).

(b) This area may be classed as the North Doncaster area, and I estimate the total thickness of coal seams to be mined at 35 feet (workable).

(c) This area I would suggest is the Barnsley Seam area proper, and the thickness of the seams I estimate at 37 feet (workable).

(d) This area I would class as the Top Hard area, such as found in the North Notts Coalfield, and I estimate the thickness of workable seams at 35 feet.

The various seams to be worked in these areas will range from a depth which might be termed an outcrop to a depth of 1500 yards or thereabouts.

THE TOTAL THICKNESS AND TONNAGE OF COAL TO BE WORKED IN THE AREA UNDER REVIEW

Assuming the whole of the coalfield is exhausted even under the town of Doncaster, etc., etc., as time goes on, the tonnage to be sent to bank would be as follows, or thereabouts :—

100,000 acres multiplied by 35 feet thick multiplied by 1300 tons per acre would represent 4550 millions of tons, which, if worked out at the rate of ten to twelve millions of tons per annum, would not be exhausted under 400 years or thereabouts.

When I refer previously to the whole of the coal seams being extracted under Doncaster, I am assuming that coal will have such a value as time rolls on, and the science of mining will have made such strides, that it will become a practical proposition under the heading of mechanical stowing of the goaf areas to carry out such a scheme with a minimum of subsidence that would not seriously affect the Ordnance Datum.

THE PROBABLE OUTPUT PER ANNUM OVER THE NEXT HUNDRED YEARS

This can only be mere conjecture, because there are so many factors to take into consideration. First of all, it is quite possible that other nationalities will become serious competitors

APPENDIX

for our foreign markets; then, as years follow on, surely we will realise more fully the intrinsic value of our coal deposits, especially as to their bye-product constituents. When we grasp this as a nation, surely less coal will be needed for home consumption. If electricity is to play the important rôle we hope it is, the expansion of such a pliable power, economically handled, should reduce our home coal bill one-half or thereabouts.

Therefore, assuming we need over the next 100 years twice the light, heat, and power, then we shall not need to exhaust the Doncaster Coalfield under review probably at a greater rate than twelve millions of tons per annum multiplied by 100 years equals 1200 million tons.

THE PROBABLE SUBSIDENCE AT THE END OF 100 YEARS would therefore work out as follows on an average over the whole area :—

$$\begin{array}{l} \text{tons} \quad \text{years} \\ \frac{12,000,000 \times 100}{100,000 \text{ acres}} = 12,000 \text{ tons per acre.} \\ \text{tons per acre} \\ \frac{12,000}{1300} \text{ tons per foot per acre} = 9.23 \text{ feet worked out.} \\ \text{feet worked out} \\ 9.23 \times .60 = \text{subsidence } 5.53 \text{ feet over 100 years.} \end{array}$$

The probable Subsidence after the whole of the minerals are exhausted would be as follows :—

$$\begin{array}{l} \text{acres} \quad \text{feet} \quad \text{tonnage per foot per acre} \\ 100,000 \times 35 \times \frac{1}{1300} \\ 35 \text{ feet of coal measures} \times .60 = \text{a total subsidence of } 21 \text{ feet.} \end{array}$$

THE SELECTION OF BUILDING SITES AND THEIR DESIGN

It will thus be seen how very essential it is that all sites for towns, villages, or buildings of any description should be carefully selected where the whole of the coal is to be mined, and the surface allowed to settle accordingly, so that, as subsidence comes along, the Ordnance Datum still remains such that does not leave room for anxiety.

My experience in respect to buildings, either where pillars of coal are left or not, is that blocks of property should be confined as far as possible to restricted ground areas, so that any tilting that comes along will do the least amount of damage, owing to the restricted length and breadth of the ties that bind the building together.

For example, in building cottages, although more expensive, the writer would suggest they should be built in blocks of two or four, rather than in long streets.

THE NECESSITY FOR EXTRACTING ALL THE COAL THAT CAN BE EXTRACTED WITH DUE REGARD TO SAFETY AND ECONOMY

Looking over the plan of this Coalfield or area under review, it will be observed it is all more or less parcelled out to various colliery owners, and, with the exception of the shaft pillars, the writer's opinion is that there is no need for any other pillars except in 'exceptional circumstances,' and then, as I say, it may pay to extract the coal and resort to mechanical stowing. Any future shafts, otherwise than those already in the mines of the colliery proprietors, can be sunk on the goaf in this area, thus minimising the necessity for shaft pillars.

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THE RISK RUN IN LEAVING PILLARS OF COAL

First of all, a pillar essential for the support of a town is quite another matter in area as the lower seams are worked, or, in other words, the pillar left in the deeper seams must not be less than an area which spreads itself out at an angle of 45° . Then there is always the *pull over* to take into consideration as the long wall faces advance up to the pillar ; especially is this a serious matter when you have to consider there may be large vertical fissures in the limestone (or faults lying at an angle with the horizontal), and in some instances hidden by the overlying sandstone.

What is the moral? In all cases where the whole of the coal can be extracted, the safest method to adopt, if mechanical stowage is not resorted to, is to ensure that the site chosen for a village or township should be well above sea level in the first instance, and as far as possible chosen on ground that is not faulted or subject to dislocation in the limestone.

THE METHOD OF WORKING IN THE DISTRICT UNDER REVIEW AND THE CONSEQUENCES

The method adopted is what is known in the mining world as Long Wall. A Long Wall Face in some cases draws from 100 to 300 yards in advance of the Coal face. This means that subsidence is going on for twelve to eighteen months before reaching the objective you may wish to support. After reaching the objective, assuming the face is travelling continuously at a rate of 200 yards per annum, it may probably be three to four years, and in some cases more, before subsidence can be reckoned on, to have, practically speaking, ceased in the locality of the objective previously mentioned. The length of time that subsidence continues depends largely on the thickness of the seam and the superincumbent strata. The stoppage of a long wall face for some considerable time is frequently a source of trouble, if the face is nearing buildings or under them, for the simple reason that the bending of the strata is not sufficiently elastic to prevent a break in the superincumbent measures which eventually cause an ugly fracture to buildings, etc., dependent on support.

As long as the strata does not suffer to the extent of breaking point, the building, reservoir, or whatever it may be, as a rule will settle gradually without serious trouble, but there is always the risk to be run with unexposed faults, fissures and breaks.

DRAINAGE, SEWAGE WORKS, ETC.

The methods to adopt in regard to Drainage and Sewage Works must always be conceived with the full knowledge that settlement will take place, and that provision for same as far as possible must be made in engineering these important devices.

If an extended scheme of electrical distribution of power, such as the 'Markham' group of collieries are putting down, can be mutually or compulsorily arranged, then I see no reason why a single acre of land should go out of cultivation, as it is simply a question of levels, raising river banks, and the sides of the dykes, to meet the continual subsidence going on, plus the cost of electrical pumping from the areas affected from time to time, which need not be a serious matter financially.

THE LIKELY FUTURE POPULATION IN THE AREA UNDER REVIEW

Surely the population will double or treble itself at least, and not so much from a mining as a manufacturing point of view, plus the attendant following who naturally migrate into an industrial area developing on the lines that the area under review must.

APPENDIX

Doncaster itself appears to me so situated geographically and geologically, that its future as a large Coal producing and manufacturing centre is undoubtedly assured, hence the necessity for taking into consideration the creation of a Doncaster and district worthy of its name for generations to come.

THE VALUE OF THE COAL SEAMS OVER THE AREA UNDER REVIEW AS COMPARED WITH THE COST OF SYSTEMATIC DRAINAGE AND PUMPING

Assuming twelve millions of tons of Coal are extracted per annum from this area, and the Government arrange with the landed proprietors and the colliery owners that a levy on every ton raised shall be made, so that the whole of the land can be kept under cultivation, what would it amount to? For the sake of argument, say 1d. per ton; this would bring in £50,000 per annum.

In conclusion, I would respectfully suggest that the coal owners and landed proprietors, etc., etc., in the area under review, should be asked to meet representatives of the Government to formulate a joint scheme that would, in the near future, deal with the question of Subsidence for all time. I feel in my own mind this is a question of national importance, owing to the variety of interests involved, and realising the enormous benefits to be derived from unity of action (in advance), rather than leaving the matters in the hands of individual interests to work out their own salvation, will mean, that large sums of money would be saved, the health of the people of the area under review would be dealt with in the most efficient manner, and in such a way as to give the best results, and that the amount of expenditure by united effort will absolutely eclipse in moderation the individual effort of the various interested parties whose interests are bound to clash.

Yours faithfully,

JOSEPH HUMBLE, M.INST.C.E.

